

FACT SHEET FOR NPDES PERMIT WA-002082-6

Alderwood Water and Sewer District Picnic Point Wastewater Treatment Facility

June 30, 2008

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Alderwood Water and Wastewater District.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before we issue the final permit. Copies of the fact sheet and draft permit for Alderwood Water and Wastewater District NPDES permit WA-002082-6 are available for public review and comment from May 20, 2008, until June 20, 2008. For more details on preparing and filing comments about these documents, please see *Appendix A - Public Involvement*.

Alderwood Water and Wastewater District reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as *Appendix I - Response to Comments*.

SUMMARY

Alderwood Water and Wastewater District (the District) operates the Picnic Point Wastewater Treatment Facility (WWTF). The facility is a 3.0-mgd activated sludge wastewater treatment plant that discharges to Possession Sound in Central Puget Sound. Ecology issued the previous permit for this facility on June 30, 2003, and will expire on June 30, 2008. The proposed permit contains the same effluent limits for Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), Fecal Coliform Bacteria, and pH. Ecology proposes to reduce the daily maximum chlorine limits to 0.75 mg/L to coincide with the present technology-based limit. Additional standard conditions for sediment monitoring and whole effluent toxicity (WET) test were included in the proposed permit.

The District plans to complete installation of a new treatment facility in 2011 with double the capacity for a total of 6.0 mgd. The membrane bioreactor (MBR) treatment plant will produce high quality effluent. The proposed permit includes limits for the new plant as well.

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I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to municipal NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (Chapter 173-220 WAC).
- Technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC).
- Water quality criteria for surface waters (Chapter 173-201A WAC) and for ground waters (Chapter 173-200 WAC).
- Sediment management standards (Chapter 173-204 WAC).

These rules require any treatment facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also define the basis for limits on each discharge and for other requirements imposed by the permit.

Under the NPDES permit program, Ecology must prepare a draft permit and accompanying fact sheet, and make it available for public review. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments on the draft permit, during a period of thirty days (WAC 173-220-050). (See *Appendix A - Public Involvement* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit. Ecology will summarize the responses to comments and any changes to the permit in Appendix I.

II. BACKGROUND INFORMATION

Table 1. General Facility Information

Applicant:	Alderwood Water and Wastewater District 3626 156 th Street Southwest Lynnwood, WA 98037-2399
Facility Name and Address:	Picnic Point Wastewater Treatment Facility 6315 Picnic Point Road Edmonds, WA 98026-3331
Type of Treatment:	Activated Sludge
Discharge Location:	Possession Sound in Central Puget Sound <u>Discharge Location:</u> Latitude: 47° 52' 47" N (47.8797222) Longitude: 122° 20' 10" W (-122.336111)
Waterbody ID Number:	<u>Waterbody I.D. No.:</u> 1224819475188 <u>Old Waterbody ID No.</u> WA-PS-0230 To find your waterbody ID number and to generate a map go to the website http://ecydevasp/website/wbid%5Ffinder/

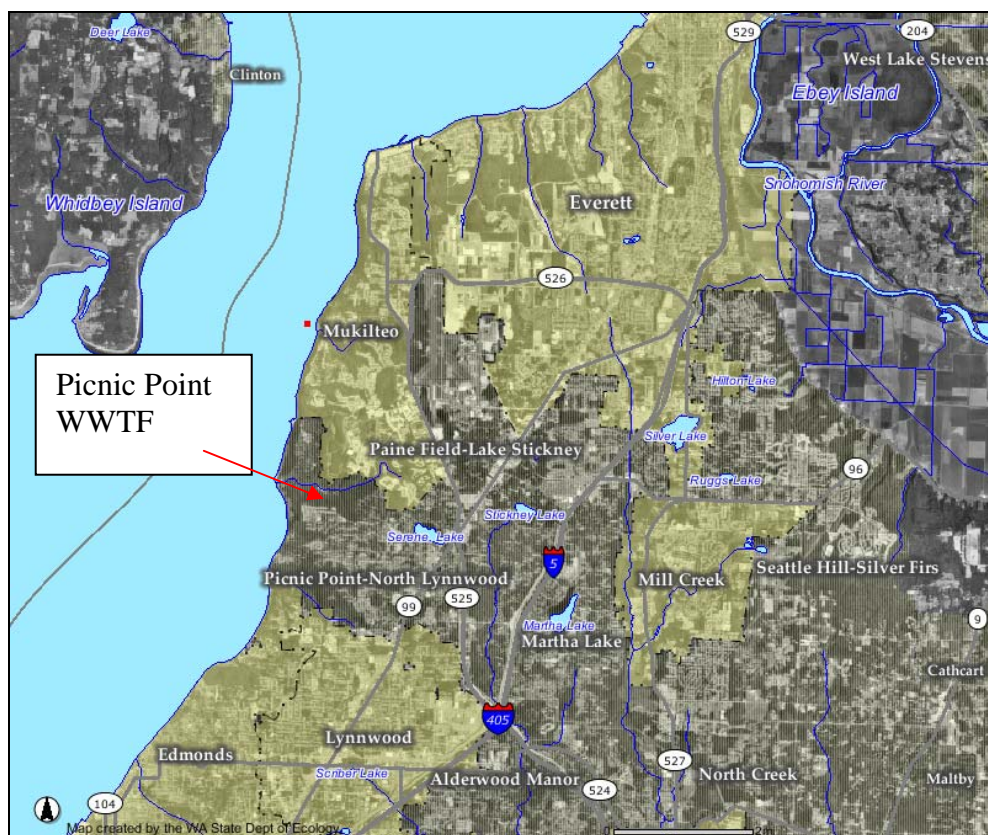


Figure 1. Facility Location Map: Picnic Point WWTF

A. Facility Description

History

The original Picnic Point Wastewater Treatment Facility (WWTF), constructed in 1973, had an average day capacity of 1.0 million gallons per day (mgd). In 1981, the District constructed treatment Unit No. 2, which provided an additional 2.0 mgd for a total current average day treatment capacity of 3.0 mgd. The District can independently operate the 1.0 mgd and 2.0 mgd contact stabilization units where wastewater treatment takes place. In addition to the two treatment units, the WWTF includes a headworks facility, a chlorine contact tank, a solid handling facility, and a plant operations building. The District plans to completely replace existing facilities with a 6.0-mgd membrane bio-reactor (MBR) plant in about 2011.

Collection System Status

The District's sewer service area encompasses approximately 26,000 acres and includes 5 drainage basins. The Picnic Point WWTF treats flows from the Picnic Point basin which includes approximately 4,191 acres.

The District's collection and conveyance system includes gravity sewer laterals, truck sewers, pump (lift) stations, force mains, and the Picnic Point WWTF. The District receives flow from Brier, Silver Lake Water District and the Mukilteo Water District, and transfers flows to the King County Department of Natural Resources and the City of Everett. According to its sewer comprehensive plan¹, the District's sewer interceptors include 189,872 feet of pipe ranging from 8 inches to 36 inches in diameter. The system includes 14 lift (pump) stations.

Treatment Processes

The District designed the existing Picnic Point WWTF to provide secondary treatment for a total average design flow of 3 mgd and a peak hour flow of 7.5 mgd. The wastewater plant's liquid stream facilities include screening, grit removal activated sludge, secondary clarification, and effluent disinfection. Two separate 1 mgd and 2 mgd contact stabilization units provide secondary treatment. Each unit contains a contact tank, a stabilization tank, a secondary clarifier, and an aerobic digester arranged in a ringed configuration.

The new Picnic Point WWTF will be a membrane bioreactor (MBR) plant. The liquid stream process elements will include fine screening, vortex grit removal, membrane bioreactor (MBR) secondary treatment, ultraviolet (UV) disinfection, odor controls systems, and standby power generation system. The solids train will include centrifuge sludge dewatering and heat drying to produce a Class A biosolids product. Refer to Appendix C to view a site layout and process flow diagram of the existing facility and a site layout for the new facility.

¹ Alderwood Sanitary Sewer Comprehensive Plan (HDR, 2000)

The Picnic Point basin is primarily residential. The application for renewal lists only one significant industrial user (SIU). Synrad, Inc. manufactures laser cutting equipment and must comply with the established local limits.

Staffing

The Picnic Point WWTF is staffed five days a week from 6:00 a.m. to 4:30 p.m. Weekend coverage consists of one operator for a period of approximately three hours to conduct a facility inspection and routine tasks. Both the existing facility and the new facility require a Class 3 certified operator or greater be in responsible charge [WAC 173-230-140, activated sludge plants greater than 1 mgd and less than or equal to 10 mgd]. The facility has four certified operators with all four operators certified at class 3 or higher.

Discharge Outfall

The treated and disinfected effluent flows into Possession Sound in Central Puget Sound through the outfall and diffuser. The 18-inch conveyance pipe is divided into two sections; an onshore ductile iron pipe section and an offshore concrete cylinder pipe section. The concrete pipe diffuser is 80 feet long with eight four-inch diameter stainless steel ports located on eight-foot centers, staggered along opposite sides of the pipe, and an 18-inch diameter flap valve with two additional ports. The midpoint of the diffuser is at a depth of -64 feet MLLW.

The District constructed the existing system in 1972. Inspections in May 2001, January 2002, and July 2006 showed that the diffuser is in good condition. Necessary repairs were made to the damaged valve flap in the summer of 2007.

Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), treatment units 1 and 2, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill. The District treats solids removed from the treatment units through sludge digestion followed by filtration using a belt filter to produce biosolids. The District sends the biosolids either Soil Key in Tenino, Washington or GroCo Inc. in Kent, Washington for composting.

B. Permit Status

Ecology issued the previous permit for this facility on June 30, 2003. The previous permit placed effluent limits on Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), Fecal Coliform, pH, and Total Residual Chlorine.

Alderwood Water and Wastewater District submitted an application for permit renewal on December 31, 2007. Ecology accepted it as complete on January 25, 2008.

C. Summary of Compliance with Previous Permit Issued on July 1, 2003

Ecology staff last conducted a non-sampling compliance inspection on May 15, 2007. The facility was found in good condition and the effluent was clear.

During the history of the NPDES permit issued on July 1, 2003, the Picnic Point Wastewater Facility has not always complied with the effluent limits and conditions of the permit. Ecology's assessment of compliance is based on our review of the facility's discharge monitoring reports (DMRs) and on inspections conducted by Ecology.

Table 2, below, summarizes the non-compliance for the period stated. The District violated effluent limits four times, but Ecology did not consider any of the violations serious enough to warrant enforcement actions. The facility took the appropriate measures in reporting and addressing these violations.

When a facility exceeds a planning trigger (85% of capacity) it must submit a plan and schedule, and when it exceeds the rated design criteria (100% of capacity), it violates the permit. During the permit term, Ecology warned the facility on numerous occasions for exceedances of the loading planning triggers and/or loading limits for BOD₅ and TSS, and flow as shown in Table 2. Ecology addressed concerns about overcapacity in a January 17, 2007, letter to the District. The District, in turn, issued a temporary sewer moratorium to allow for time to address overcapacity. The District has adopted sound plans to operate the facility in such a manner that it can meet effluent limits until it completes the new facility in 2011.

Refer to Appendix D for a complete summary of all DMR data for the period as shown in the table below.

Table 2. Compliance Summary

Count of Violation, July 1, 2003 to December 31, 2007					
Monitoring Point	Parameter		Unit	Number of Warnings	Number of Violation
Effluent	Total Residual Chlorine	Monthly average	MG/L		1
	Fecal Coliform	7-day Geometric Mean	#/100 ML		1
	Flow	Monthly Average	mgd	3 ^a	
	TSS	Weekly Average	LBS/DAY		1
	TSS	Weekly Average	MG/L		1
Influent	BOD	Monthly Average	LBS/DAY	53 ^a	21 ^b
	TSS	Monthly Average	LBS/DAY	22 ^a	
Total				78	25

^a Warnings for flow, influent BOD, and influent TSS when reported value is greater than 85% of design.

^b Violations for flow, influent BOD, and influent TSS when reported value is greater than 100% of design.

D. Wastewater Characterization

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. Appendices C, D, and E provide more complete data characterizing the effluent. The Picnic Point WWTF serves a mostly residential area and therefore has a low potential for high levels of toxic pollutant in the influent. The secondary treatment process produces a high quality effluent. The effluent is characterized as follows:

Table 3. NPDES Application Data Summary

NPDES Permit Application A12, Conventional Pollutants.

PARAMETER		MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE				
		Value	Units	Value		Units	Number of Samples	
pH (Minimum)		6.50	s.u.					
pH (Maximum)		7.30	s.u.					
Flow Rate		4.39	MGD	2.12	MGD	365.00		
Temperature (Winter)		16.50	*C	15.00	*C	156.00		
Temperature (Summer)		19.20	*C	18.00	*C	156.00		
* For pH please report a minimum and a maximum daily value								
POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units	Number of Samples		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS								
BIOCHEMICAL OXYGEN DEMAND	BOD5	44.00	MG/L	20.00	MG/L	156.00	SM5210B	1.00
	FECAL COLIFORM	500.00	#/100ML	35.00	#/100m	156.00	SM9222D	1.00
	TOTAL SUSPENDED SOLIDS (TSS)	19.00	MG/L	14.00	MG/L	156.00	SM2540D	1.00

NPDES Permit Application B6.

POLLUTANT	MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE			ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Conc.	Units	Number of		
CONVENTIONAL AND NON CONVENTIONAL COMPOUNDS							
AMMONIA (as N)	11.00	MG/L	9.00	MG/L	2.00	350.10	0.005
CHLORINE (TOTAL RESIDUAL, TRC)	0.27	MG/L	0.19	MG/L	2.00	330-5	0.100
DISSOLVED OXYGEN	6.80	MG/L	6.50	MG/L	2.00	360.20	1.000
TOTAL KJELDAHL NITROGEN (TKN)	11.00	MG/L	9.70	MG/L	2.00	351.30	0.100
NITRATE PLUS NITRITE NITROGEN	11.00	MG/L	10.40	MG/L	2.00	353.20	353.200
OIL and GREASE	7.40	MG/L	4.20	MG/L	2.00	1664.00	1.000
PHOSPHORUS (Total)	4.90	MG/L	4.20	MG/L	2.00	365.10	0.005
TOTAL DISSOLVED SOLIDS (TDS)	200.00	MG/L	190.00	MG/L	2.00	160.10	1.000

NPDES Permit Application D, Pollutant present in detectable levels.

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS, AND HARDNESS.											
COPPER	0.004	MG/L			0.004	MG/L			2.00	200.70	0.00
LEAD	0.002	MG/L			0.002	MG/L			2.00	239.20	0.00
ZINC (correction to application per data submitted)	0.068	MG/L			0.053	MG/L			2.00	200.70	0.00
HARDNESS (AS CaCO3)	35.00	MG/L			32.000	MG/L			2.00	130.20	1.00
BASE-NEUTRAL COMPOUNDS											
BIS (2-ETHYLHEXYL) PHTHALATE (correction to application per data submitted)	110	UG/L			110	UG/L			2.00	EPA 625	2.00

Table 4. DMR Data Summary

Parameter	Footnote ^a	Units	Average	Minimum	Maximum	Limit
Flow	AVG	mgd	2.15	1.83	2.84	3
Flow	MAX	mgd	2.55	1.93	4.39	NA
BOD	AVG	MG/L	17	11	27	30
BOD	AVW	MG/L	24	12	44	45
BOD	AVG	LBS/DAY	314	184	550	750
BOD	AVW	LBS/DAY	490	249	918	1125
BOD	AVG	PERCENT	94	90	96	85
TSS	AVG	MG/L	15	6	20	30
TSS	MAX	MG/L	20	13	47	45
TSS	AVG	LBS/DAY	262	28	398	750
TSS	AVW	LBS/DAY	452	273	1720	1125
TSS	AVG	PERCENT	93	90	95	85
pH	MAX	STANDARD UNITS	7.1	6.6	7.7	9.0
pH	MIN	STANDARD UNITS	6.4	6.0	6.9	6.0
Fecal Coliform	GEM	#/100 ML	28	2	120	200
Fecal Coliform	GM7	#/100 ML	73	5	417	400
Total Residual Chlorine	AVG	MG/L	0.32	0.12	0.55	0.50
Total Residual Chlorine	MAX	MG/L	0.63	0.28	0.99	1.00

^a AVG=Average AVW=Highest Weekly Average GEM=Geometric Mean MAX=Maximum MIN=Minimum MXD=Max Daily GM7=highest 7-day Geometric Mean

III. PROPOSED PERMIT LIMITS

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application. Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, or do not have a reasonable potential to cause a water quality violation.

Ecology typically does not develop limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. Alderwood Water and Wastewater District is required to notify Ecology (40 CFR 122.42(a)) if significant changes occur in any constituent of the effluent discharge. Alderwood Water and Wastewater District may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

A. Design Criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology-approved design criteria for this facility's treatment plant were obtained from the *Alderwood Water District Picnic Point Wastewater Treatment Plant Evaluation Report* prepared by HDR and approved by Ecology. Ecology-approved design criteria for the new facility's treatment plant were obtained from the *Facilities Plan Picnic Point Wastewater Treatment Facility* prepared by Brown and Caldwell and approved by Ecology on September 20, 2007.

Table 5. Design Criteria for Picnic Point Wastewater Treatment Facility.

Parameter	Existing Design Criteria	New Design Criteria
Monthly average flow (maximum month)	3.0 mgd	6.0 mgd
Instantaneous peak flow (wet weather)		13.2 mgd
BOD ₅ influent loading	5,000 lb/day	11,009 lb/day
TSS influent loading	5,000 lb/day	13,461 lb/day

B. Technology-based Effluent Limits

Federal and state regulations define technology-based effluent limits for municipal wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for municipal wastewater.

Chapter 173-221 WAC lists the following technology-based limits for pH, fecal coliform, BOD₅, and TSS:

Table 6. Technology-based Limits.

Parameter	Limit
pH	Shall be within the range of 6.0 to 9.0 standard units.
Fecal Coliform	Monthly Geometric Mean = 200 organisms/100 mL
Bacteria	Weekly Geometric Mean = 400 organisms/100 mL
BOD ₅	Average Monthly Limit is the most stringent of the following:
(concentration)	- 30 mg/L
	- may not exceed fifteen percent (15%) of the average influent concentration
	Average Weekly Limit = 45 mg/L
TSS	Average Monthly Limit is the most stringent of the following:
(concentration)	- 30 mg/L
	- may not exceed fifteen percent (15%) of the average influent concentration
	Average Weekly Limit = 45 mg/L
Chlorine	Average Monthly Limit = 0.5 mg/L
	Average Weekly Limit = 0.75 mg/L

The technology-based monthly average limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, *Wastewater Engineering, Treatment, Disposal and Reuse*, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

The technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Interim Limits:

Monthly effluent mass loadings for both BOD₅ and TSS (lbs/day) = maximum monthly design flow (3.0 mgd) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit **750 lbs/day**.

The weekly average effluent mass loading for both BOD₅ and TSS (lbs/day) = 1.5 x monthly loading = **1,125 lbs/day**.

Final Limits:

Monthly effluent mass loadings for both BOD₅ and TSS (lbs/day) = maximum monthly design flow (6.0 mgd) x Concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit **1,501 lbs/day**.

The weekly average effluent mass loading for both BOD₅ and TSS (lbs/day) = 1.5 x monthly loading = **2,252 lbs/day**.

C. Surface Water Quality-based Effluent Limits

The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are listed in the water quality standards for surface waters (Chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other disease, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (WAC 173-201A) limit concentrations of toxic, radioactive, or deleterious material. Levels are set below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh and marine surface waters in the state of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements:

- Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in Chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

A Tier II analysis focuses on evaluating feasible alternatives that would eliminate or significantly reduce the level of degradation. The analysis also includes a review of the benefits and costs associated with the lowering of water quality. New discharges and facility expansions are prohibited from lowering water quality without providing overriding public benefits.

Ecology’s analysis described in this fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

Ecology determined that a Tier II analysis was not required because this facility will not cause measurable degradation to existing water quality at the edge of the chronic mixing zone. Table 3 summarizes the definition of “measurable change” for each parameter of concern. This table also shows the calculated change expected at the edge of the chronic mixing zone for each of the parameters. Using a chronic dilution factor of 195 and the technology-based limits, the calculated change is much lower than that considered to be measurable for all parameters except fecal coliform. Calculations show fecal coliform concentrations at the edge of the mixing zone to be 2 cfu/100 ml higher than ambient concentrations when Ecology assumed an effluent concentration of 400 cfu/100 ml. However, since this facility treats wastewater with MBRs and UV, Ecology expects fecal coliform levels of 0 to 5 cfu/100mL. As long as this facility meets permit limits, it will not cause measurable degradation to existing water quality at the edge of the chronic mixing zone. MBR systems produce an effluent lower in biochemical oxygen demand (BOD). Overall, conversion to an MBR process will lead to an overall reduction in BOD and commensurately the effluent will impact dissolved oxygen level in the receiving water less. Because MBR processes denitrify for operational reason, the effluent will have lower level of ammonia. Even at higher flows, total ammonia load will not measurably increase. Ecology does not have information on the removal level for other toxics by the MBR process. However, MBRs provide a removal of total suspended solids (TSS) of 2 mg/L or less based on operation data from other MBR processes in the region. Improved solids removal will reduce the level of some toxics that are in the solids fraction.

Table 7. Demonstration of ‘No Measurable Change’ at edge of chronic mixing zone.

Parameter	Definition of ‘Measurable Change’ from ambient conditions*	Estimated Change at Edge of Chronic Mixing Zone
Temperature	Increase of 0.3°C or greater	0.00°C (Appendix F, Table F-7)
Dissolved oxygen	Decrease of 0.2 mg/L or greater	MBR systems produce effluent of approx. 5 mg/L BOD and the high dilution. No increase expected. (Appendix F, Table F-8)
Bacteria level (fecal coliform)	Increase of 2 cfu/100 mL or greater	2 cfu/100 mL (Appendix F, Table F-7)
pH	Change of 0.1 units or greater	Marine waters have high buffering capacity. No increase expected. (Appendix F, Table F-9)
Turbidity	Increase of 0.5 NTU or greater	No increase expected. No background data available.
Toxic or radioactive substances	Any detectable increase	Due to high dilution of 195, no increase expected. No background data available.

* As defined by Ecology, 2005: *Supplementary Guidance, Implementing the Tier II Antidegradation Rules*, page 6. Concentrations at Chronic Mixing Zone

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within 200 to 300 feet from the point of discharge and use no more than 25% of the available width of the water body for dilution. We use modeling to estimate the amount of mixing within the mixing zone. Through modeling we determine the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's *Permit Writer's Manual*). Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. We use dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone.

2. The facility must fully apply “all known, available, and reasonable methods of prevention, control and treatment” (AKART) to its discharge.

Ecology has determined that the treatment provided at the Picnic Point WWTF meets the requirements of AKART (see “Technology-based Limits”).

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the waterbody’s critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology’s *Permit Writer’s Manual* describes additional

guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: <http://www.ecy.wa.gov/biblio/92109.html>.

4. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem, or
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect 95% of the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, we conclude that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant. We concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume rises through the water column as it mixes, therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

We determined the acute criteria will be met at 10% of the distance of the chronic mixing zone at the ten-year low flow.

- **The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- **Comply with size restrictions**

The mixing zone authorized for this discharge complies with the size restrictions published in Chapter 173-201A WAC.

9. Overlap of Mixing Zones

This mixing zone does not overlap another mixing zone.

D. Description of the Receiving Water

Picnic Point Wastewater Treatment Facility discharges to Possession Sound in the Central Puget Sound. Other nearby point source outfalls include Mukilteo Water District's Wastewater Treatment Plant to the north and the City of Lynnwood's Wastewater Treatment Plant to the south. Significant nearby non-point sources of pollutants include stormwater. The area along the shoreline is residential presenting low potential for significant non-point sources.

The ambient background data used for this permit used Ecology's ambient marine monitoring data of monitoring station PSS010 (available at http://www.ecy.wa.gov/programs/eap/mar_wat/mwm_intr.html):

Table 8. Summary of Ambient Background Data (Appendix F-6)

Parameter	Value used
Temperature (highest annual 1-DADMax)	19.2° C
pH Min/Max	7.3/8.7
Dissolved Oxygen, average, 5 th percentile	8.5 mg/L, 5.9 mg/L

E. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in Chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). Criteria applicable to this facility's discharge are summarized below in Table 5.

Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

- (a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
- (b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

- (c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
- (d) **Fair quality** salmonid and other fish migration.

The Aquatic Life Uses for this receiving water are identified below.

The designated aquatic life use for this receiving water is Extraordinary Quality, as defined in Table 9, below.

Table 9. Aquatic Life Uses and Associated Criteria

Extraordinary Quality	
Temperature Criteria – Highest 1D MAX	13°C (55.4°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	7.0 mg/L
Turbidity Criteria	<ul style="list-style-type: none"> • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units.

To protect **shellfish harvesting**, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

Recreational Uses include primary contact recreation and secondary contact recreation. The designated recreational use for this receiving water is Primary Contact Recreation, as defined in Table 10, below.

Table 10. Recreational Use

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies /100 mL.

The designated **Miscellaneous Marine Water Uses** for this waterbody include wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

F. Evaluation of Surface Water Quality-based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by Chapter 173-201A WAC.

Chronic Mixing Zone

WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports as measured during MLLW. The horizontal distance of the chronic mixing zone is 264 feet. The mixing zone extends from the seabed to the top of the water surface.

Acute Mixing Zone

WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone for Outfall 001 extends 26.4 feet in any direction from any discharge port.

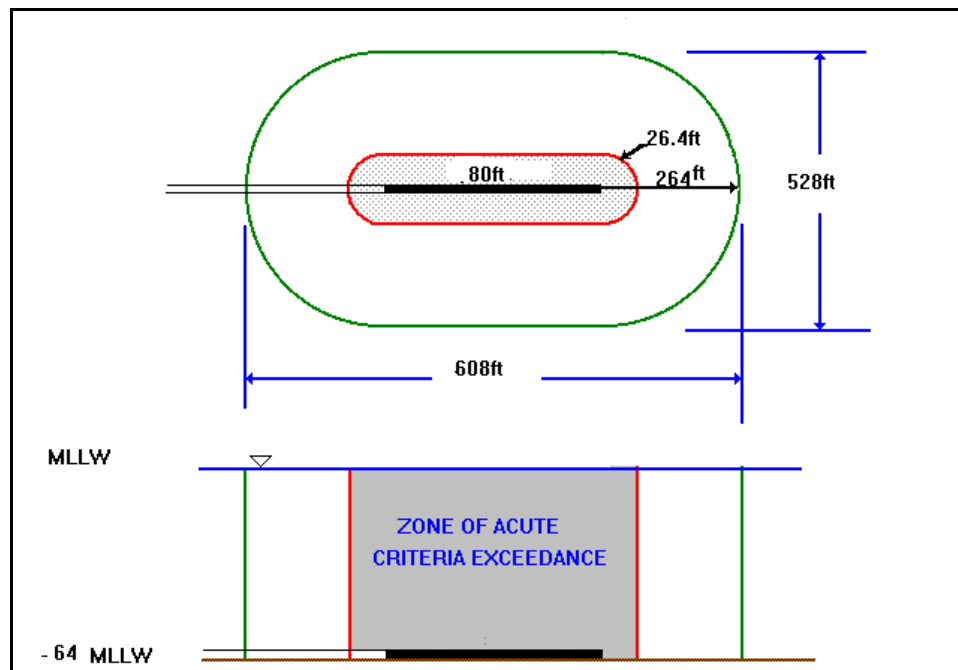


Figure 2. Allowable Chronic and Acute Mixing Zones

The diffuser is 80 feet long with a diameter of 18 inches. The diffuser has a total of ten 4-inch diameter ports. The distance between ports is 8 feet. The diffuser depth is -78 feet. (OR) The mean lower low water (MLLW) depth and the diffuser is -64 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted on July 1, 2006.

Ecology determined the dilution factors that occur within these zones at the critical condition using Plumes Model. The dilution factors are listed in Table 11:

Table 11. Dilution Factors (DF)

	Interim Permit Dilution Factor based on 3.0 mgd	Final Permit Dilution Factor² based on 6.0 mgd
Acute Aquatic Life Criteria	105	59
Chronic Aquatic Life Criteria	265	195
Human Health Criteria - Carcinogen	Not Available	Not Available

Ecology determined the impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, nutrients and other toxics as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD5—With technology-based limits, this discharge results in a small amount of BOD loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

Temperature—The state temperature standards include multiple criteria, each with different durations of exposure and points of application. Ecology evaluates each criterion independently to determine reasonable potential and permit limits. Refer to Appendix F.

A conservative screening analysis can be performed with just effluent temperature data and the dilution factor to show that a reasonable potential clearly does not exist. No reasonable potential exists to exceed the temperature criterion where:

$$\begin{aligned}
 &(\text{Criterion} + 0.3) > \text{Criterion} + \frac{(T_{\text{effluent}95} - \text{Criterion})}{\text{DF}} \\
 &13 + 0.3 > 13 + \frac{(16.5 - 13)}{195} \\
 &13.3 > 13.018
 \end{aligned}$$

This screening analysis must be performed with both the annual maximum and any supplementary spawning criterion.

² Source: Facility Plan Picnic Point Wastewater Treatment Plant, September 2007, p. 6-4.

Temperature Chronic Effects

1. Annual summer maximum.

The annual maximum temperature criteria (13°C) protects specific categories of aquatic life by controlling the effect of human actions on summer temperatures. Marine water criteria are expressed as the highest one-day annual maximum temperature (1-DMax).

Ecology does not have background temperature data for the receiving water in the vicinity of the outfall. Ecology does measure water quality parameters at several monitoring stations in Puget Sound. We evaluated temperature measurements at three locations closest to this facility's outfall for this analysis. The data indicate that this area of Puget Sound naturally has higher temperatures than the criteria in the summer months.

Monitoring Station	90th Percentile Temperature for Data Set (degree C)	Comment
PSS008 Possession Sound - PG Bay Pier 3	17.8	Shallow and furthest from outfall.
PSS010 Possession Sound - Added Post-9/11 for TFR	14.9 Summer max. 8/10/04, 19.2°C	Nearest monitoring station to outfall.
PSS019 Possession Sound - Gedney Island	14.6	

To determine reasonable potential for either the annual summer maximum or supplementary spawning criteria, calculate the temperature at the edge of the chronic mixing zone (T_{chronic}) during critical condition(s):

$$T_{\text{chronic}} = T_{\text{ambient90}} + (T_{\text{effluent95}} - T_{\text{ambient90}}) / DF$$

$$T_{\text{chronic}} = 11.9 + (18.2 - 11.9) / 195 = 11.9 + .032 = 11.932$$

Only if T_{chronic} is greater than the applicable criterion (13°C), is an effluent limit is needed. There is not reasonable potential to exceed the temperature standard. Refer to Appendix F, Table F6 for Ambient Monitoring Data at PSS010 at 50-70 meters depth, outfall at 60 meters.

2. Incremental warming criteria

Some waters are naturally incapable of meeting their assigned threshold temperature criteria. At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the

edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25 percent or less of the critical flow. This is because the fully mixed effect on temperature will be only a fraction (0.075°C or less) of the 0.3°C cumulative allowance for all human sources combined.

Picnic Point WWTF reported a maximum effluent temperature of 19.2°C on their NPDES application. Using the dilution ratio of 195:1 (receiving water : effluent) and maximum daily temperature of 19.2°C for the receiving water and 19.2°C for the effluent, the predicted maximum daily temperature inside the dilution zone is $((195 \times 19.2) + (1 \times 19.2)) / (195 + 1) = 16.02^\circ\text{C}$. Thus, under the worst case scenario, the effluent discharge from this facility results in warming of the ambient temperature by 0.00°C, which is less than the allowable warming temperature of 0.3°C.

Since the discharge does not have a potential to violate the water quality standards for temperature in the receiving water, Ecology placed no limits in the permit for effluent temperature. To acquire better effluent temperature data, the proposed permit requires the Picnic Point WWTF to monitor the effluent temperature during the afternoon hours between 2 p.m. and 5 p.m., three times a week once the MBR system is in operation. Based on existing temperature data for the receiving water and effluent, the permit does not require an effluent temperature limit. The need for a limit will be evaluated during the next permit cycle.

Temperature Acute Effects

1. Instantaneous lethality to passing fish.

The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge. The upper 99th percentile daily maximum effluent temperature prior to discharge is less than 33°C. Therefore, there is no instantaneous lethality for passing fish.

2. General lethality and migration blockage.

Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C. The receiving water conditions are listed in Table 8 of the fact sheet. The listed temperature values meet these criteria.

pH—Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water. Refer to Appendix F.

Fecal Coliform—Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a chronic dilution factor of 195. Refer to Appendix F.

With the dilution ratio of 195:1 and the technology-based limit of 400/100 ml, resulting increase would be 2/100 mL fecal coliform. The ambient fecal concentration is 3/100 mL. The fecal coliform concentration at the edge of the mixing zone boundary was calculated to be 5/100 mL, well below the water quality standard of 14 colonies/100 mL. Therefore, the proposed permit includes the technology-based effluent limitation for fecal coliform bacteria.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge at detectable levels: *chlorine, ammonia, Bis(2-Ethylhexyl) Phthalate, Copper, Lead and Zinc*. Ecology conducted a reasonable potential analysis (See Appendix F) to determine whether effluent limits for these pollutants would be required in this permit, using procedures given in EPA, 1991.

No valid ambient background data was available for the above listed toxic pollutants. With the exception of chlorine, Ecology found no reasonable potential to exceed the water quality criteria using zero for background. Ecology determined water quality-based limits for chlorine (See Appendix F-4). The proposed permit includes either the technology-based or water quality-based limit whichever is more stringent.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station PSS010 and Ecology spreadsheet tools.

Water quality criteria for most metals published in Chapter 173-201A WAC are based on the dissolved fraction of the metal (see footnotes to table WAC 173-201A-240(3)).

Picnic Point WWTF may provide data to clearly demonstrate seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Ecology may adjust metals criteria on a site-specific basis when data clearly demonstrates the seasonal partitioning in the ambient water in relation to an effluent discharge.

Ecology may also adjust metals criteria using the water effects ratio approach established by the EPA, as generally guided by the procedures in *U.S. EPA Water Quality Standards Handbook* (December 1983, as supplemented or replaced).

G. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent.* Dischargers who monitor their wastewater using acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
- *Chronic toxicity tests measure various sublethal toxic responses,* such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Using the screening criteria in Chapter 173-205-040 WAC, Ecology determined that the Picnic Point Wastewater Facility's effluent has the potential to cause aquatic toxicity. The proposed permit contains WET testing requirements as authorized by RCW 90.48.520 and 40 CFR 122.44, using procedures from Chapter 173-205 WAC. The proposed permit requires the facility to conduct WET testing at prescribed intervals for one year, to characterize both the acute and chronic toxicity of the effluent.

If the year of WET testing shows acute or chronic toxicity levels that have a reasonable potential to cause receiving water toxicity, then the proposed permit will:

- Set a limit on acute or chronic toxicity.
- Require this facility operator to conduct WET testing to monitor compliance with an acute toxicity limit, a chronic toxicity limit, or both.
- Specify the procedures the facility operator must use to come back into compliance if toxicity exceeds the limits.

Ecology-accredited WET testing laboratories use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff knows how to calculate an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (<http://www.ecy.wa.gov/biblio/9580.html>), which is referenced in the permit. Ecology recommends that each regulated facility send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

If the WET tests conducted during effluent characterization indicate no reasonable potential for effluent discharges to cause receiving water toxicity, the Picnic Point Wastewater Facility's NPDES permit will not impose WET limits. The facility must retest the effluent prior to submitting an application for permit renewal (to demonstrate that effluent toxicity has not increased).

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the Permittee to conduct additional effluent characterization.

- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that toxicity in the effluent has increased. The Picnic Point WWTF may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

H. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern for human health, based on data or information indicating regulated chemicals occur in the discharge.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d). We followed the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. Our evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

I. Sediment Quality

The aquatic sediment standards (Chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400).

Ecology determined that this discharge has potential to cause a violation of the sediment quality standards because of the capacity of the facility. (Ecology is recommending baseline sediment testing for all facilities greater than 1 mgd). The proposed permit includes a condition requiring Picnic Point WWTF to demonstrate either:

- The point of discharge is not an area of deposition, or
- Toxics do not accumulate in the sediments even though the point of discharge is a depositional area.

J. Ground Water Quality Limits

The ground water quality standards (Chapter 173-200 WAC) protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100). Picnic Point WWTF does not discharge wastewater to the ground. No permit limits are required to protect ground water.

K. Comparison of Effluent Limits with the Previous Permit Issued on July 1, 2003

Table 12. Comparison of Effluent Limits

Monitoring Point	Parameter	Unit	Value Type	Old Permit Limits		New Interim Limits		New Final Limits		Comment
				Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	
Influent	BOD	lbs/day	average		4250		4250		9358	85% Design
Influent	BOD	lbs/day	average		5000		5000		11009	100% Design
Influent	TSS	lbs/day	average		4250		4250		11442	85% Design
Influent	TSS	lbs/day	average		5000		5000		13461	100% Design
Effluent	Flow	mgd	average		2.55		2.55		5.1	85% Design
Effluent	Flow	mgd	average		3.0		3.0		6.0	100% Design
Effluent	BOD	mg/L	average		30		30		30	
Effluent	BOD	mg/L	weekly average		45		45		45	
Effluent	BOD	lbs/day	average		750		750		1501	based on 6.0 mgd
Effluent	BOD	lbs/day	weekly average		1125		1125		2252	based on 6.0 mgd
Effluent	BOD, % Removal	percent	average	85.0		85.0		85.0		
Effluent	TSS	mg/L	average		30		30		30	
Effluent	TSS	mg/L	weekly average		45		45		45	
Effluent	TSS	lbs/day	average		750		750		1501	
Effluent	TSS	lbs/day	weekly average		1125		1125		2252	
Effluent	TSS, % Removal	percent	average	85.0		85.0		85.0		
Effluent	pH	standard units	minimum	6.0		6.0		6.0		
Effluent	pH	standard units	maximum		9.0		9.0		9.0	
Effluent	Total Residual Chlorine	mg/L	average		0.50		0.50		0.30	
Effluent	Total Residual Chlorine	mg/L	maximum		1.0		0.75		0.75	
Effluent	Fecal Coliform	#/100 ML	geometric mean		200		200		200	
Effluent	Fecal Coliform	#/100 ML	7-day geometric mean		400		400		400	

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for activated sludge type treatment plant.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

A. Lab Accreditation

Ecology requires that all monitoring data (with the exception of certain parameters) must be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. Ecology accredited the laboratory at this facility for fecal coliform, TSS, BOD, and total residual chlorine.

V. OTHER PERMIT CONDITIONS

A. Reporting and Record Keeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Prevention of Facility Overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

C. Operation and Maintenance (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

Inflow and Infiltration (I/I) Study

Significant portions of the collection system are 30 years old. Due to the age of the collection system, leaks are expected to be present. The permit will require the collection system to be characterized for the presence of leaks:

- How much of the annual average and peak daily flow under worst conditions (inflow or infiltration) can be attributed to leaks?
- Where are the (individual) leaks?
- How large is each leak or how much inflow or infiltration does a run of sewer contribute?
- Are the force mains and/or inverted siphons experiencing exfiltration?

Three good references to aid in these tasks are:

1. American Society of Civil Engineers and Water Environment Federation Manual of Practice FD-6, *Existing Sewer Evaluation and Rehabilitation*.
2. U.S. Environmental Protection Agency, *Handbook for Sewer System Infrastructure Analysis and Rehabilitation*, EPA/625/6-91/030, 1991.

3. Washington State Department of Transportation, *Standard Specifications for Road, Bridge, and Municipal Construction*, 2002.

Following characterization of the leaks, Ecology may require corrective actions by issuing an administrative order following review of the assessment.

D. Pretreatment

The proposed permit requires Picnic Point WWTF to conduct an industrial user survey to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations (40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act), with state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances.

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986), the Department of Ecology (Ecology) has been delegated authority to administer the Pretreatment Program. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue their own wastewater discharge permits. The requirements for a Pretreatment Program are contained in Title 40, Part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), Ecology is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) (40 CFR 403.8 (f)(1)(i)).

Ecology is responsible for issuing State Waste Discharge Permits to industrial users of the sewer system. Industrial dischargers must obtain these permits from Ecology before the POTW accepts the discharge (WAC 173-216-110(5)). Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to take “continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs)” discharging to their sewer system. Examples of such routine measures include regular review of business tax licenses, water billing records, and existing connection authorization records. System maintenance personnel can also identify and report new industrial dischargers in the course of performing their jobs. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW must notify an industrial discharger, in writing, of their responsibility to apply for a State Waste Discharge Permit and send a copy of the written notification to Ecology.

Requirements for Performing an Industrial User Survey

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs. Of equal importance, the survey should provide sufficient information about industries which discharge to the POTW to determine whether they require state waste discharge permits or other regulatory controls. An Industrial User Survey helps to prevent interference with treatment processes at the POTW and to protect water quality. The Industrial User Survey can also help maintain sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first portion of the provision prohibits acceptance of pollutants, which causes pass-through or interference. The definitions of pass-through and interference are in Appendix B of the fact sheet.
- The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which result in toxic gases are prohibited. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.
- The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from Ecology. These discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by Ecology for Developing Partial Pretreatment Program by POTW

Ecology commits to providing technical and legal assistance to Picnic Point WWTF in fulfilling these joint obligations. In particular, Ecology will assist with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

E. Residual Solids Handling

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW, Chapter 173-308 WAC “Biosolids Management,” and Chapter 173-350 WAC “Solid Waste Handling Standards.” The disposal of other solid waste is under the jurisdiction of the Snohomish County Health Department.

F. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

The proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

G. Outfall Evaluation

The proposed permit requires Alderwood Water and Wastewater District to conduct an outfall inspection and submit a report detailing the findings of that inspection (Condition S.13). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

H. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual municipal NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary, to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Alderwood Specific References:

Facility Plan Picnic Point Wastewater Treatment Facility, URS, September 2007

Effluent Mixing Report, Picnic Point Wastewater Treatment Facility, URS, January 2007.

General References:

Environmental Protection Agency (EPA)

1992. *National Toxics Rule*. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

2006. *Permit Writer's Manual*. Publication Number 92-109

(<http://www.ecy.wa.gov/biblio/92109.html>)

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information

(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Water Pollution Control Federation.

1976. *Chlorination of Wastewater*.

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to Alderwood Water and Wastewater District. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on January 28, 2008, and February 4, 2008, in the *Everett Herald* to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology placed a Public Notice of Draft on May 23, 2008, in the *Everett Herald* to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice –

- Tells where copies of the draft permit and fact sheet are available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at <http://www.ecy.wa.gov/biblio/0307023.html>.

You may obtain further information from Ecology by telephone, 425-649-7201, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
NWRO Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

The primary author of this permit and fact sheet is Karen Burgess.

APPENDIX B—GLOSSARY

Acute Toxicity—The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART—An acronym for “all known, available, and reasonable methods of prevention, control and treatment.”

Ambient Water Quality—The existing environmental condition of the water in a receiving water body.

Ammonia—Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation—The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)—Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅—Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass—The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine—Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity—The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)—The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and, as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample—A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity—Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring—Uninterrupted, unless otherwise noted in the permit.

Critical Condition—The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor (DF)—A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report—A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria—Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample—A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater—Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility—A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation—The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)—The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility—A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone—An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)—The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH—The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)—A calculated value five times the MDL (method detection level).

Responsible Corporate Officer—A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit—A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)—Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters—Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater—That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset—An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit—A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C—APPLICATION DATA SUMMARY, TABLE D COMPLETE

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
METALS (TOTAL RECOVERABLE), CYANIDE, PHENOLS, AND HARDNESS.											
ANTIMONY	N/D	MG/L			N/D	MG/L			2.00	200.70	0.01
ARSENIC	N/D	MG/L			N/D	MG/L			2.00	200.90	0.00
BERYLLIUM	N/D	MG/L			N/D	MG/L			2.00	200.70	0.00
CADMIUM	N/D	MG/L			N/D	MG/L			2.00	200.70	0.00
CHROMIUM	N/D	MG/L			N/D	MG/L			2.00	200.70	0.00
COPPER	0.004	MG/L			0.004	MG/L			2.00	200.70	0.00
LEAD	0.002	MG/L			0.002	MG/L			2.00	239.20	0.00
MERCURY	N/D	MG/L			N/D	MG/L			2.00	245.20	0.00
NICKEL	N/D	MG/L			N/D	MG/L			2.00	200.70	0.01
SELENIUM	N/D	MG/L			N/D	MG/L			2.00	270.20	0.00
SILVER	N/D	MG/L			N/D	MG/L			2.00	200.70	0.01
THALLIUM	N/D	MG/L			N/D	MG/L			2.00	279.20	0.00
ZINC (correction to application per data submitted)	0.068	MG/L			0.053	MG/L			2.00	200.70	0.00
CYANIDE	N/D	MG/L			N/D	MG/L			2.00	335.20	0.01
TOTAL PHENOLIC COMPOUNDS	N/D	MG/L			N/D	MG/L			2.00	420.20	0.01
HARDNESS (AS CaCO3)	35.00	MG/L			32.000	MG/L			2.00	130.20	1.00
VOLATILE ORGANIC COMPOUNDS											
ACROLEIN	N/D	UG/L			N/D	UG/L			2.00	EPA 624	5.00
ACRYLONITRILE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	5.00
BENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
BROMOFORM	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
CARBON TETRACHLORIDE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
COLORBENZEN	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
CHLOROBIDBROMO-METHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
CHLOROETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	5.00
2-CHLORO-ETHYLVINYL ETHER	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
CHOLOROFORM	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
DICHLOROBROMO-METHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
1,1-DICHLOROETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
TRANS-1,2-DICHLORO-ETHYLENE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
1,1-DICHLOROPROPANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
ETHYLBENZEN	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
METHYL BROMIDE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	5.00
METHYL CHLORIDE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.50
METHYLENE CHLORIDE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.50
1,1,2,2-TETRACHLORO-ETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
TETRACHLORO-ETHYLENE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
TOLUNE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
1,1,1-TRICHLOROETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
1,1,2-TRICHLOROETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
TRICH LORETHYLENE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	1.00
VINYL CHLORIDE	N/D	UG/L			N/D	UG/L			2.00	EPA 624	5.00
ACID-EXTRACTABLE COMPOUNDS											
P-CHLORO-M-CRESOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
2-CHLOROPHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
2,4-DIMETHYLPHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
4,6-DINITRO-O-CRESOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
2-NITROPHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
4-NITROPHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	1.00
PENTA CHLOROPHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	0.50
PHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
2,4,6-TRICHLORO	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
PHENOL	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00

POLLUTANT	MAXIMUM DAILY DISCHARGE				AVERAGE DAILY DISCHARGE					ANALYTICAL METHOD	ML/MDL
	Conc.	Units	Mass	Units	Conc.	Units	Mass	Units	Number of Samples		
BASE-NEUTRAL COMPOUNDS											
ACENAPHTHENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
ACENAPHTYLENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
ANTHRACENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BENZIDINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	50.00
BENZO(A) ANTHRACENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BENZO(A)PYRENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	0.50
3,4 BENZO-FLUORANTHENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BENZO(GHI)PERYLENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	4.00
BENZO(K)FLOURANTHENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BIS (2-CHLORO ETHOXY) METHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BIS (2-CHLOROETHYL)-ETHER	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BIS (2-CHLOROISO-PROPYL) ETHER	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BIS (2-ETHYLHEXYL) PHTHALATE (application modified per data provided.)	110.000	UG/L			110.00	UG/L			2.00	EPA 625	2.00
4-BROMOPHENYL PHENYL ETHER	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
BUTYL BENZYL PHTHALATE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
2-CHLORO NAPHTHALENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
4-CHLORPHENYL PHENYL ETHER	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
CHRYSENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
DI-N-BUTYL PHTHALATE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
DI-N-OCTYL PHTHALATE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
DIBENZO(A,H) ANTHRACENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	4.00
1,2-DICHLORO BENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
1,3-DICHLORO BENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
1,4-DICHLORO BENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
3,3-DICHLORO BENZIDINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	3.00
DIETHYL PHTHALATE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
DIMETHYL PHTHALATE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
2,4-DINITROTOLUENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
2,6-DINITROTOLUENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
1,2-DIPHENYLHYDRAZINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
FLUORANTHENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
FLUORENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
HEXACHLORO BENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
HEXACHLOROBUTADIENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
HEXACHLOROCYCLO-PENTADIENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
HEXA CHLOROETHANE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
INDENO(1,2,3-CD) PYRENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	4.00
ISOPHORONE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
NAPHTHALENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
NITROBENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
N-NITROSODI-N-PROPYLAMINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
N-NITROSODI-METHYLAMINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
N-NITROSODI-PHENYLAMINE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	5.00
PHENANTHRENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
PYRENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00
1,2,4-TRICHLOROBENZENE	N/D	UG/L			N/D	UG/L			2.00	EPA 625	2.00

APPENDIX D—DISCHARGE MONITORING REPORT SUMMARY TABLES

Discharge Monitoring Data, July 1, 2003 to December 31, 2007

Facility: Alderwood
Permit No: WA-002082-2

Influent								
Date	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED
	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	LBS/DAY	LBS/DAY	MG/L	MG/L	LBS/DAY	LBS/DAY	MG/L	MG/L
1-Jul-03	5036	5841	326	382	4044	5493	261	352
1-Aug-03	4743	5665	315	369	4026	4965	260	316
1-Sep-03	4844	5565	314	359	4301	5422	270	340
1-Oct-03	4886	6789	303	381	4147	5905	247	310
1-Nov-03	5282	7637	288	376	4381	6401	244	354
1-Dec-03	5274	7031	268	349	4652	7684	236	370
1-Jan-04	4721	6102	234	288	4287	6078	207	274
1-Feb-04	4686	5744	232	276	4293	6880	206	276
1-Mar-04	5416	6835	289	372	4679	8254	244	432
1-Apr-04	5020	6203	302	424	4090	5711	238	310
1-May-04	4694	5624	289	356	3981	5126	240	292
1-Jun-04	5021	6385	304	390	4035	5252	240	306
1-Jul-04	4986	5863	309	362	4361	6261	267	362
1-Aug-04	4932	7605	306	458	4279	6304	260	380
1-Sep-04	4995	5556	298	327	4392	8552	256	468
1-Oct-04	4859	5705	295	349	4065	5642	241	320
1-Nov-04	5263	6132	298	335	4662	7281	258	412
1-Dec-04	5508	6257	278	313	4458	7334	223	356
1-Jan-05	5284	5963	274	313	4634	7134	235	340
1-Feb-05	5054	5855	281	333	4118	6518	224	322
1-Mar-05	4871	5877	289	350	3955	6802	233	388
1-Apr-05	5029	6088	264	340	4008	5512	206	308
1-May-05	4875	5261	273	297	4205	6412	231	334
1-Jun-05	5634	7072	291	357	4588	6845	234	330
1-Jul-05	5681	9452	318	446	4883	6396	271	334
1-Aug-05	4981	6746	314	428	4458	5781	279	396
1-Sep-05	4998	6418	319	380	4326	7053	264	334
1-Oct-05	5004	6361	321	428	4265	6342	265	358
1-Nov-05	5447	7408	306	406	4686	6276	255	362
1-Dec-05	5518	6739	272	327	4602	6935	230	344
1-Jan-06	5223	6880	237	319	4687	6331	198	276
1-Feb-06	4720	5655	232	310	3859	5727	191	252
1-Mar-06	4931	5615	226	284	4144	5920	229	326
1-Apr-06	4780	5811	282	354	4355	7628	247	384
1-May-06	4905	6181	294	383	3688	4662	215	288
1-Jun-06	5479	6406	327	395	4112	5224	241	302
1-Jul-06	4731	7759	299	483	3359	4378	211	274
1-Aug-06	4277	5073	280	334	3377	4060	22	264
1-Sep-06	4204	5423	277	352	3685	4353	243	310
1-Oct-06	4556	6030	297	380	3834	5589	250	340
1-Nov-06	4769	6871	239	315	3885	5036	193	266
1-Dec-06	5251	6217	239	325	4328	5337	196	254
1-Jan-07	4888	6012	251	286	3776	4790	193	264
1-Feb-07	4113	5376	255	306	3260	4240	198	238
1-Mar-07	4569	5957	256	331	3625	5020	199	278
1-Apr-07	4282	5118	268	343	3442	4352	210	270
1-May-07	5091	6954	280	385	3894	5164	212	286
1-Jun-07	5383	6388	292	338	4043	5295	219	286
1-Jul-07	4775	6053	271	332	3951	5190	223	294
1-Aug-07	4434	5636	265	324	3689	4762	221	278
1-Sep-07	4365	5323	282	326	3540	5024	228	308
1-Oct-07	4561	6145	287	385	3411	4306	214	270
1-Nov-07	4477	5729	264	351	3437	4331	202	252
1-Dec-07	4534	7591	210	345	3375	4105	154	210
AVE:	4,905	6,245	277	351	4,017	5,618	219	308
MIN:	4,113	5,073	210	284	3,260	4,060	22	210
MAX:	5,681	9,452	327	483	4,883	7,628	279	412
LIMIT:	4,250	na	na	na	4,250	na	na	na
Previous Limit na	na	na	na	na	na	na	na	na
DESIGN:	5,000				5,000			

exceeds design criteria

85% of 100% of

Discharge Monitoring Data, July 1, 2003 to December 31, 2007

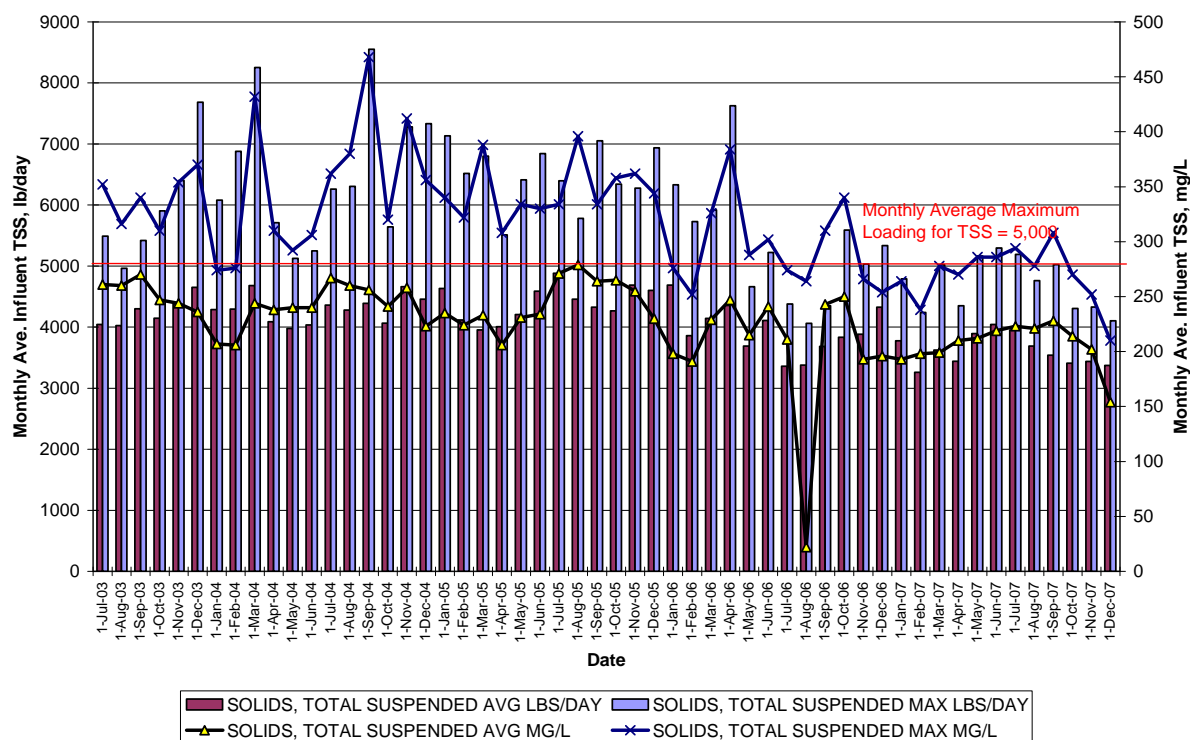
Facility: Alderwood
Permit No: WA-002082-2

Effluent																			
Date	FLOW, IN CONDUIT OR THRU	FLOW, IN CONDUIT OR THRU	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY (20 DEG. C)	BOD, 5-DAY PERCENT REMOVAL	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, TOTAL SUSPENDED	SOLIDS, SUSPENDED, % REMOVAL	PH	PH	COLIFORM, FECAL	COLIFORM, FECAL	CHLORINE, TOTAL RESIDUAL	CHLORINE, TOTAL RESIDUAL	
	AVG	MAX	AVG	AVW	AVG	AVW	AVG	AVG	MAX	AVG	AVW	AVG	MAX	MIN	GEM	GM7	AVG	MAX	
	MGD	MGD	MG/L	MG/L	LBS/DAY	LBS/DAY	PERCENT	MG/L	MG/L	LBS/DAY	LBS/DAY	PERCENT	S.U.	S.U.	#/100 ML	#/100 ML	MG/L	MG/L	
1-Jul-03	1.87	2.056	14	18	208	360	96	19	20	307	464	93	6.67	6.26	17	45	0.28	0.69	
1-Aug-03	1.868	2.058	12	15	190	253	96	18	20	269	468	93	6.73	6.01	4	6	0.43	0.77	
1-Sep-03	1.9	2.125	12	15	184	265	96	19	20	303	496	93	6.71	6.07	35	131	0.39	0.89	
1-Oct-03	2.004	2.796	14	16	221	286	95	20	23	333	630	92	6.64	6.06	15	42	0.48	0.88	
1-Nov-03	2.229	3.273	16	19	313	433	94	15	17	265	434	94	7.51	6.58	5	10	0.55	0.92	
1-Dec-03	2.424	2.839	13	22	261	619	95	13	14	252	430	94	7.07	6.07	3	5	0.4	0.76	
1-Jan-04	2.497	3.053	13	16	266	362	94	14	15	293	451	93	7.12	6.04	9	16	0.36	0.74	
1-Feb-04	2.51	2.989	13	15	264	315	94	14	17	293	430	93	6.98	6.2	31	86	0.28	0.49	
1-Mar-04	2.309	2.601	18	19	328	417	94	19	21	377	530	92	7.08	6.68	42	104	0.17	0.3	
1-Apr-04	2.074	2.349	15	17	259	326	95	16	19	265	418	93	7.07	6.43	25	79	0.21	0.48	
1-May-04	1.977	2.261	13	15	208	292	96	15	18	247	382	94	7.21	6.5	39	109	0.35	0.85	
1-Jun-04	2.032	2.41	12	12	192	300	96	14	16	234	395	94	6.94	6.43	18	78	0.32	0.82	
1-Jul-04	1.957	2.097	15	17	242	332	95	13	15	207	373	95	6.95	6.32	12	26	0.35	0.81	
1-Aug-04	1.963	2.136	13	15	212	249	96	12	13	208	337	95	7.52	6.27	61	93	0.17	0.36	
1-Sep-04	2.026	2.265	14	15	237	290	95	18	22	305	555	92	7.06	6.28	21	78	0.32	0.8	
1-Oct-04	2.03	2.306	12	13	203	296	96	14	16	237	353	94	7.02	6.3	5	5	0.44	0.63	
1-Nov-04	2.157	2.441	13	14	236	323	96	14	14	244	383	95	6.94	6.5	24	55	0.24	0.41	
1-Dec-04	2.422	2.943	14	15	292	391	95	15	16	311	511	93	7.02	6.42	22	51	0.32	0.51	
1-Jan-05	2.367	2.77	15	17	278	377	95	16	17	313	446	93	7.17	6.58	21	102	0.31	0.78	
1-Feb-05	2.225	2.745	17	24	312	625	94	12	14	225	299	94	7.01	6.46	36	84	0.26	0.42	
1-Mar-05	2.033	2.203	11	17	266	324	94	12	13	205	298	95	7.12	6.62	12	27	0.27	0.53	
1-Apr-05	2.342	2.595	16	20	314	378	94	14	16	271	362	93	7.04	6.71	8	19	0.31	0.52	
1-May-05	2.175	2.472	16	19	277	402	94	16	17	289	494	93	7.03	6.67	21	48	0.27	0.47	
1-Jun-05	2.34	2.627	17	21	314	451	94	13	14	246	349	94	7.02	6.37	31	109	0.3	0.5	
1-Jul-05	2.152	2.55	13	18	242	511	96	13	14	28	371	95	7.16	6.35	19	65	0.36	0.62	
1-Aug-05	1.904	1.999	15	15	239	335	95	14	15	215	316	95	7.01	6.28	16	24	0.39	0.78	
1-Sep-05	1.97	2.532	16	17	249	353	95	16	20	275	507	94	7.02	6.21	51	69	0.36	0.86	
1-Oct-05	1.934	2.191	20	27	316	661	94	18	20	299	409	93	7.02	6.33	15	88	0.4	0.67	
1-Nov-05	2.21	2.897	18	20	323	584	94	15	16	269	428	94	7.04	6.47	21	161	0.39	0.88	
1-Dec-05	2.386	3.14	27	38	550	918	90	18	23	357	554	92	7	6.6	8	14	0.37	0.86	
1-Jan-06	2.842	3.553	21	32	466	807	91	16	18	398	867	92	7.15	6.64	8	11	0.39	0.99	
1-Feb-06	2.462	3.282	13	17	359	455	92	6	14	261	437	92	7.15	6.74	2	6	0.5	0.95	
1-Mar-06	2.191	2.56	18	20	316	508	93	12	13	230	304	94	7.2	6.67	23	34	0.3	0.48	
1-Apr-06	2.085	2.45	23	35	413	743	92	13	15	223	327	94	7.28	6.72	27	46	0.29	0.32	
1-May-06	2.039	2.348	24	36	407	579	92	13	22	231	391	94	7.49	6.41	52	67	0.21	0.34	
1-Jun-06	2.043	2.421	26	40	451	666	92	16	26	276	450	93	6.84	6.27	116	255	0.16	0.28	
1-Jul-06	1.9	2.037	25	42	397	672	92	17	28	268	476	92	7.02	6.6	100	283	0.12	0.33	
1-Aug-06	1.828	1.934	22	31	341	470	92	20	33	298	477	91	7.07	6.39	72	417	0.32	0.75	
1-Sep-06	1.831	2.061	23	34	347	503	92	16	28	235	458	93	7.29	6.51	26	47	0.35	0.96	
1-Oct-06	1.843	2.094	22	32	339	480	92	13	21	205	347	95	7.25	6.34	10	10	0.31	0.89	
1-Nov-06	2.432	3.182	24	35	479	772	90	14	23	295	471	93	7.27	6.63	14	43	0.27	0.64	
1-Dec-06	2.677	3.55	21	30	470	854	91	14	21	314	482	93	7.33	6.86	13	26	0.32	0.44	
1-Jan-07	2.353	2.901	17	37	370	596	93	11	15	212	339	95	7.26	6.42	16	46	0.29	0.48	
1-Feb-07	1.966	2.153	25	44	397	694	90	17	33	270	501	92	7.7	6.5	26	28	0.33	0.64	
1-Mar-07	2.181	2.543	21	39	377	712	92	13	18	237	333	93	7.43	6.12	6	7	0.23	0.54	
1-Apr-07	1.964	2.438	18	25	291	453	93	12	17	208	319	94	7.31	6.65	68	194	0.31	0.59	
1-May-07	2.205	2.376	25	39	491	690	91	14	21	255	415	93	6.86	6.34	120	196	0.18	0.29	
1-Jun-07	2.214	2.417	23	41	423	777	92	15	24	278	460	93	7.3	6.4	10	10	0.41	0.88	
1-Jul-07	2.131	2.368	21	32	361	564	92	18	31	319	555	92	7.63	6.86	12	27	0.33	0.52	
1-Aug-07	2.006	2.221	18	35	305	606	93	16	29	253	531	93	7.31	6.88	46	142	0.32	0.6	
1-Sep-07	1.854	1.986	16	31	243	492	94	11	18	173	296	95	7.24	6.77	39	93	0.23	0.43	
1-Oct-07	1.929	2.177	15	22	235	373	95	12	17	195	273	94	7.11	6.36	24	65	0.28	0.51	
1-Nov-07	2.044	2.34	15	21	254	369	94	11	15	188	289	94	7.1	6.5	22	22	0.27	0.46	
1-Dec-07	2.6	4.389	17	28	406	613	92	14	47	357	1720	90	7.31	6.45	16	23	0.39	0.68	
AVE:	2.146	2.546	17.41	24.43	313.59	490.3	93.6	14.69	19.67	261.50	451.69	93	7.13	6.45	28.06	72.72	0.32	0.63	
MIN:	1.828	1.934	11.00	12.00	184.00	249.0	90.0	6.00	13.00	28.00	273.00	90	6.64	6.01	2.00	5.00	0.12	0.28	
MAX:	2.842	4.389	27.00	44.00	550.00	918.0	96.0	20.00	47.00	398.00	1,720.00	95	7.70	6.88	120.00	417.00	0.55	0.99	
LIMIT:	2.550	na	30	45	750	1125	85	30	45	750	1125	85	9.0	6.0	200	400	0.50	1.00	
Previous																			
DESIGN:	3.00																		

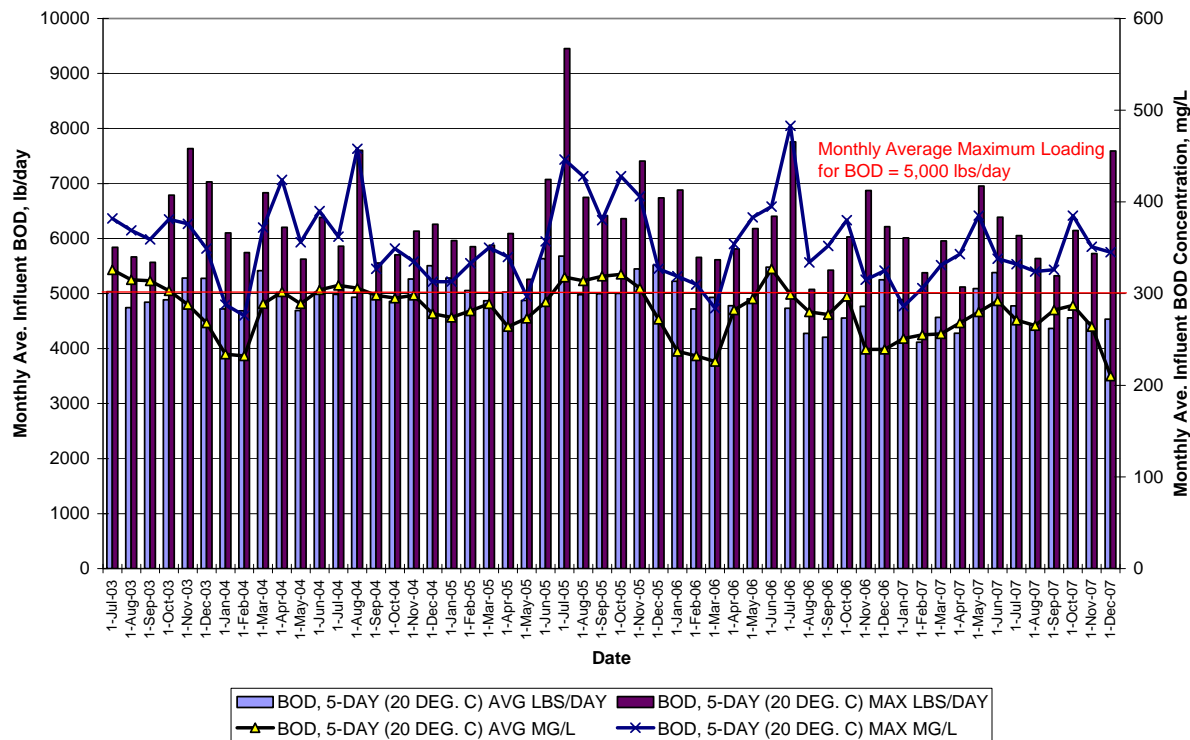
exceeds permit limits

APPENDIX E—DISCHARGE MONITORING REPORT GRAPHS

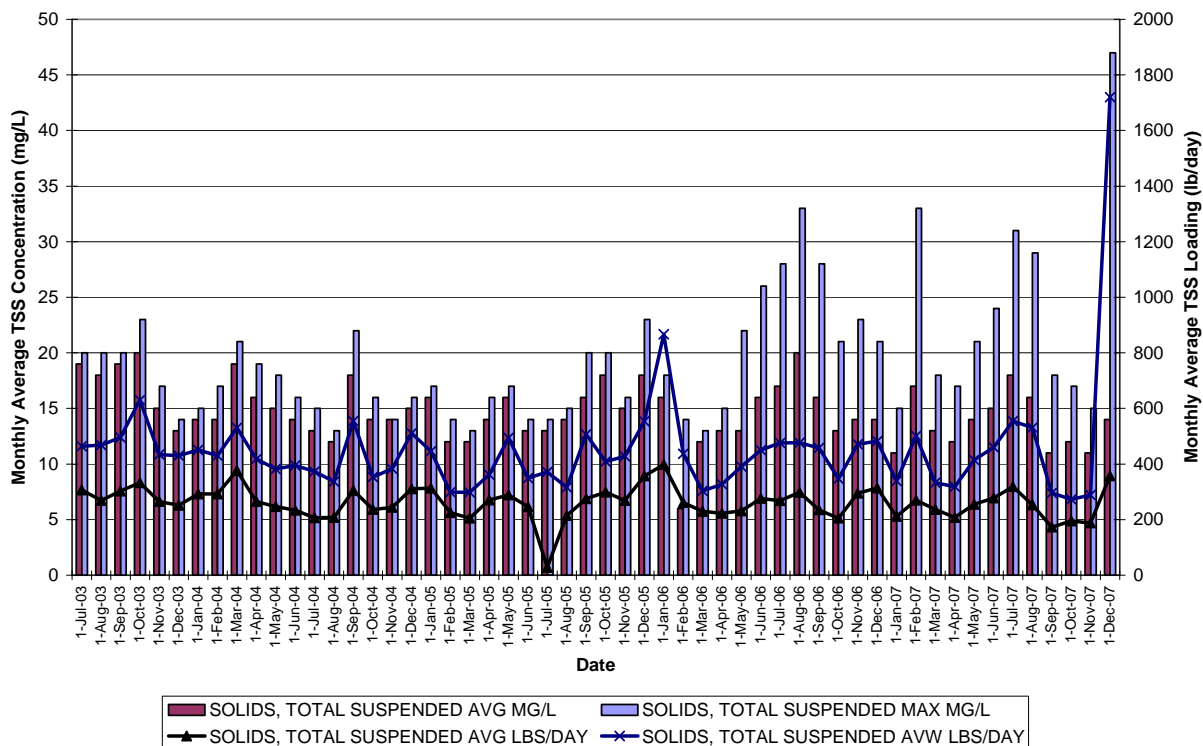
Alderwood - Influent Total Suspended Solids (TSS)



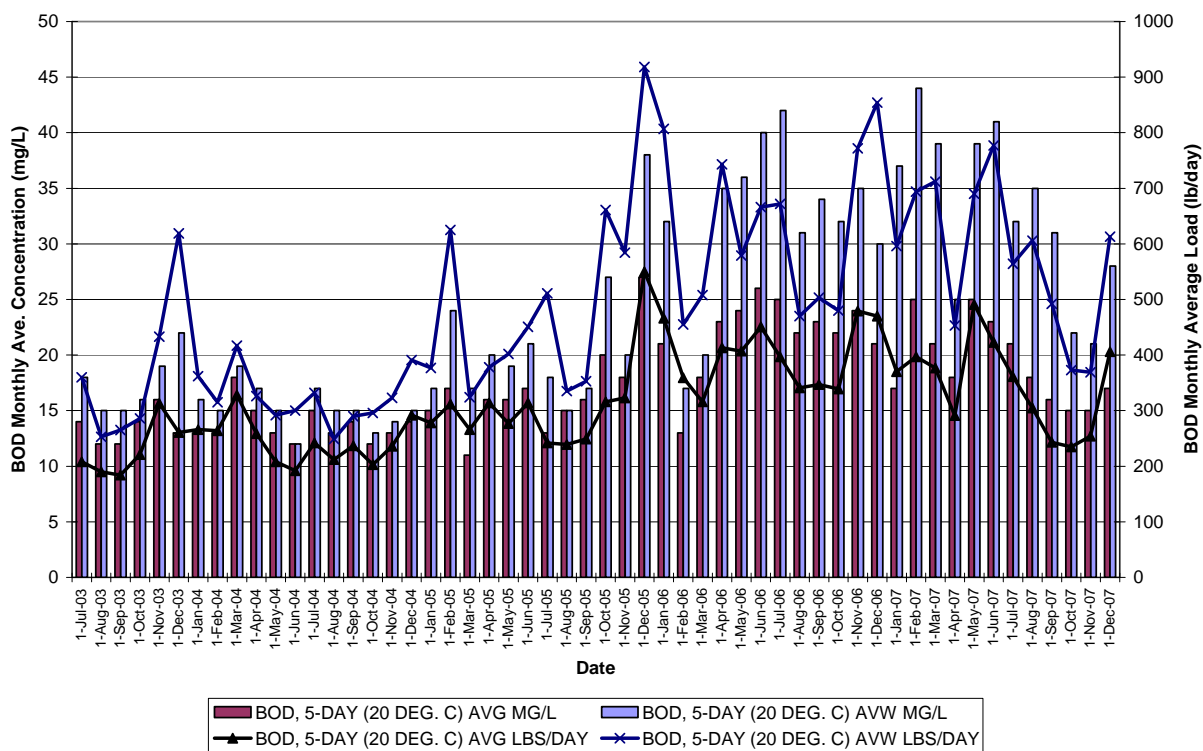
Alderwood - Influent Biochemical Oxygen Demand (BOD)



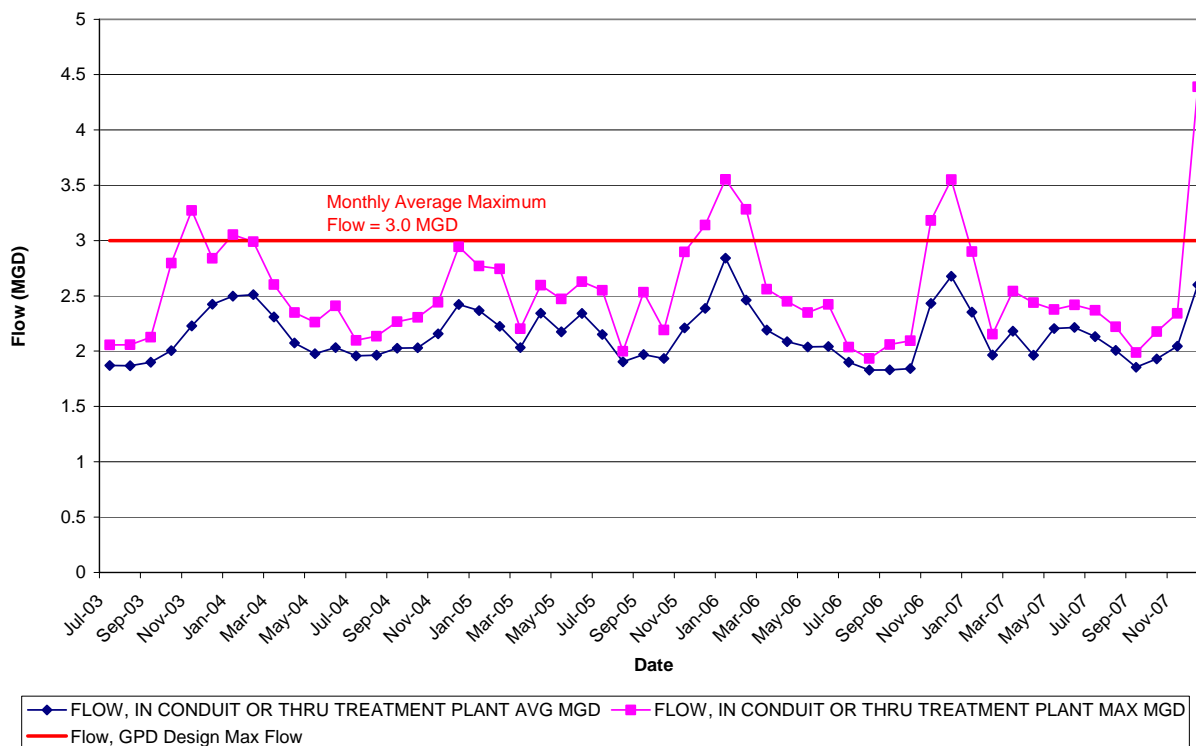
Alderwood - Monthly Average Effluent TSS Loading



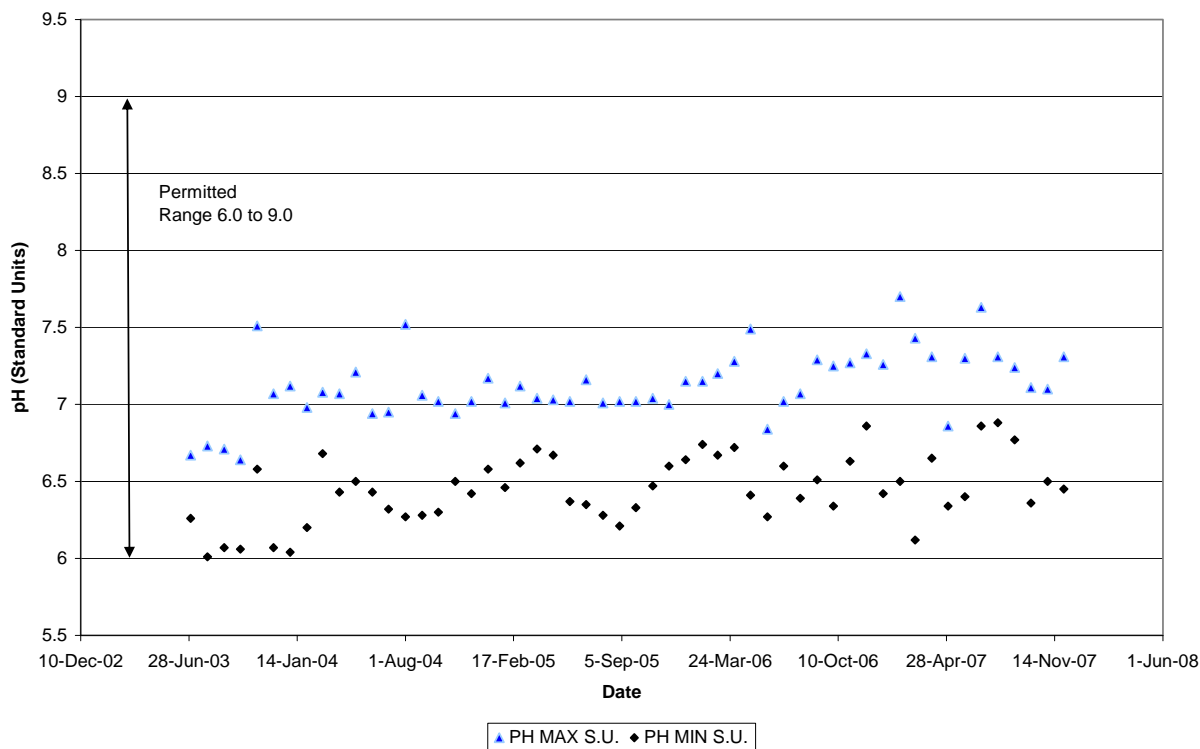
Alderwood - Monthly Average Effluent BOD Loading



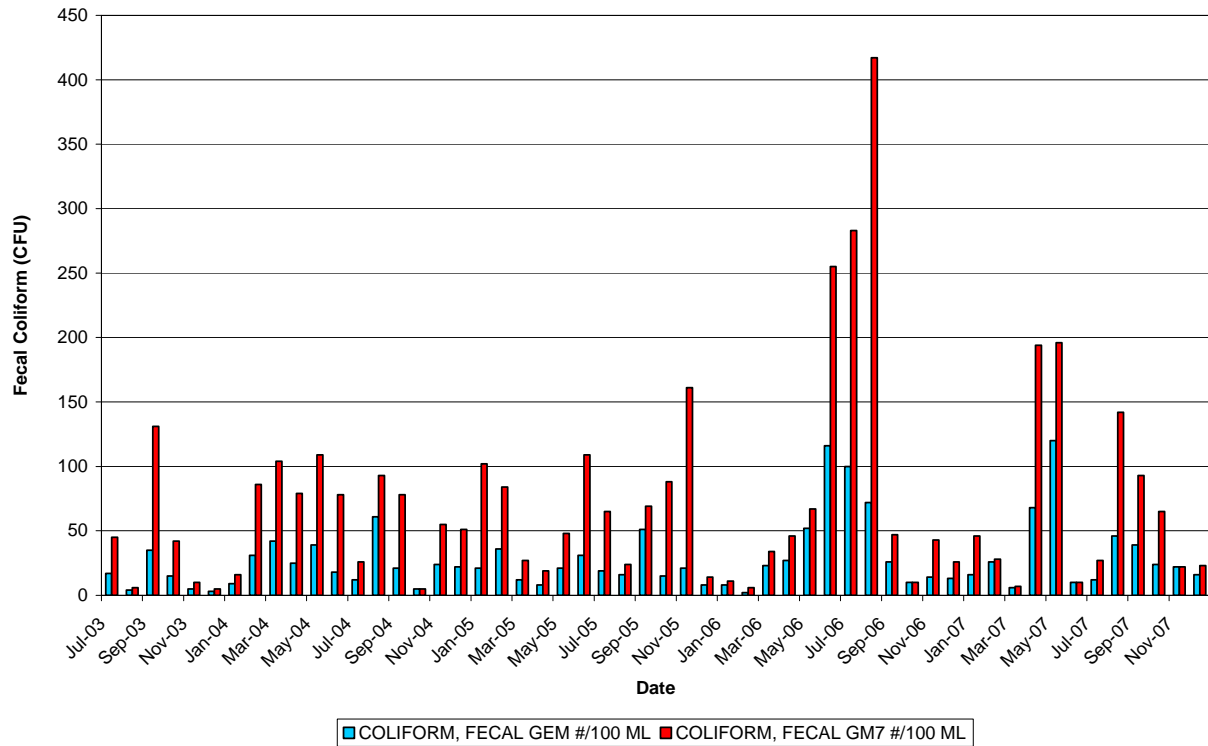
Alderwood - Effluent Flow



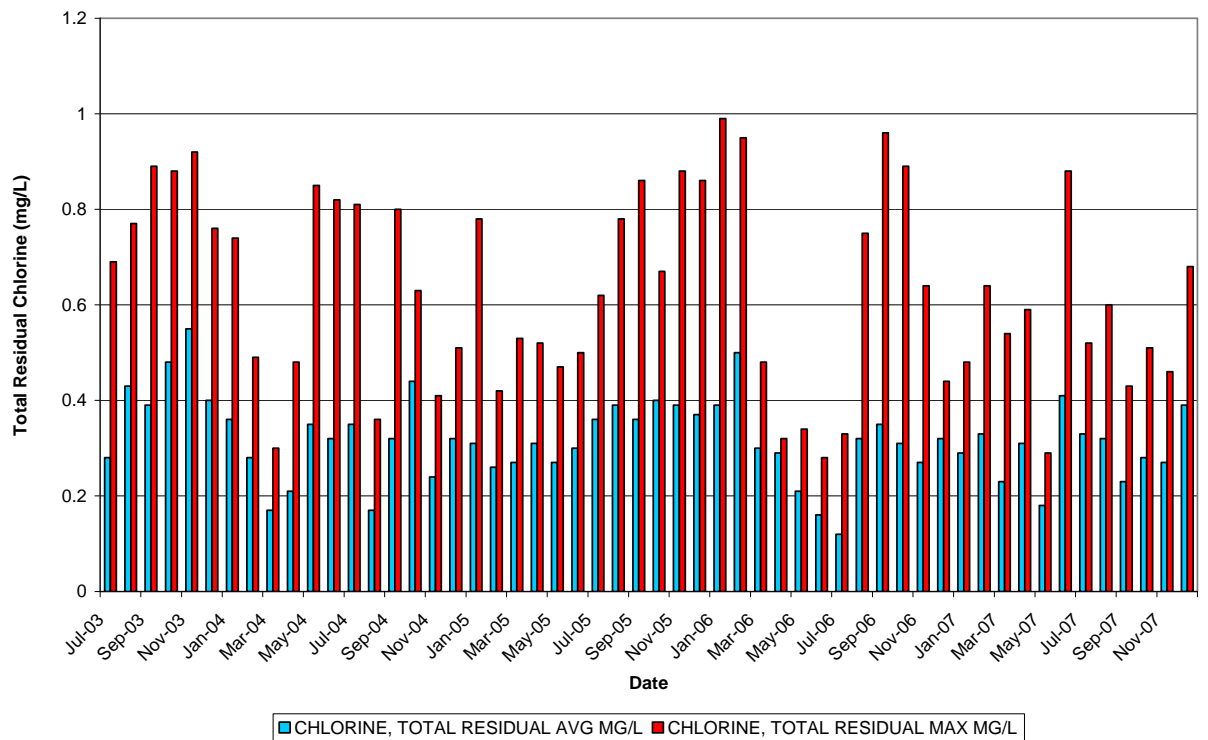
Alderwood - pH Monthly High and Low



Alderwood - Fecal Coliform (CFU)



Alderwood - Total Residual Chlorine



APPENDIX F—TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at <http://www.ecy.wa.gov> .

Table F-1: Water Quality Criteria for Detected Pollutants

FACILITY: Alderwood WWTF
FILENAME:
RUN DATE: 3/17/2008
PREPARED: Karen Burgess

Red font = National Toxics Rule (40 CFR 131.36)
Blue font = EPA National Recommended Water Quality Criteria:2002 (EPA 822-R-02-47)
Green font = Other source - see comment
Black font = WAC 173-201A (Nov. 1997)

Input Required Data
ENTER RECEIVING WATER TSS (IF UNKNOWN) 0
IF RECEIVING WATER TSS IS ANNUAL DATA S
HARDNESS VALUE USED FOR HARDNESS 35
DEPENDENT LIMITS>>>>
* = INSUFFICIENT DATA TO DEVELOP CRITERIA
VALUE PRESENTED IS TH L.O.E.L- LOWEST

Units
mg/L
mg/L at
CaCO₃

WATER QUALITY CRITERIA (in ug/L unless otherwise noted)

Pollutant Detected Input "y"	Pollutant	CAS No.	NPDES Application Reference No.	Hardness or pH dependent	Conversion Factor	Conversion Factor Chronic	Priority Pollutants	Carcinoge n	Water Quality Criteria - Acute Marine - Acute	Water Quality Criteria - Marine - Chronic	Human Health Criteria - Marine	Organoleptic Effects	Metals Translators - Marine - Acute Chronic	Metals Translators - Marine - Acute
11.00	AMMONIA	unionized -see separete spreadsheets for FW criteria					N	N	233	35				
110.00	BIS(2-ETHYLHEXYL) PHTHALATE	117817	13B				Y	Y	4.80	3.10	5.9	1000.00	0.83	0.83
4.00	COPPER	744058	6M	35.0			Y	N	210.00	8.10			0.951	0.95
2.00	LEAD	7439921	7M	35.0	0.94		Y	N	90.00	81.00		5000.00	0.946	0.946
37.00	ZINC	7440666	13M	35.0			Y	N						

Updated the formulas and values to match with WAC 173-201A in December of 1992. Enter the hardness value for the receiving water for hardness dependent metals in B200 and TSS values in B199.
Spreadsheet updated with human health criteria by Gary Bailey in March 1995 and checked by G. Shervey
Metal criteria changed to those announced in FR Vol. 60 No.86 5/4/95 (10/95)
Metal translators added 6/96 (based on work by Pelletier and FR Vol 60, No.86 5/4/95)
Criteria values updated 9/03

Table F-2: Ammonia Calculation Spreadsheet

Ammonia Calculation Spreadsheet

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-93.

INPUT			
1. Temperature (deg C):	12.9	95th	
2. pH:	8.1	95th	
3. Salinity (g/Kg):	28.8	average	
OUTPUT			
1. Pressure (atm; EPA criteria assumes 1 atm):	1.0		
2. Molal Ionic Strength (not valid if >0.85):	0.591		
3. pKa8 at 25 deg C (Whitfield model "B"):	9.314		
4. Percent of Total Ammonia Present as Unionized:	2.412%		
5. Unionized ammonia criteria (mg un-ionized NH3 per liter) from EPA 440/5-88-004			
Acute:	0.233		
Chronic:	0.035		
6. Total Ammonia Criteria (mg/L as NH3)			
Acute:	9.66		
Chronic:	1.45		
7. Total Ammonia Criteria (mg/L as NH3-N)			
Acute:	7.94	7941	ug/L
Chronic:	1.19	1193	ug/L

[illegible]

Table F-4: Chlorine Limit to Meet Water Quality Limit

Water Quality-Based Limit									
Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.									
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments
PARAMETER			Acute	Chronic	ug/L	ug/L	ug/L	ug/L	
Design Flow 3.0 MGD									
Chlorine	105.0	265.00			13.0000	7.5000	521.4	1365.0	
Design Flow 6.0 MGD									
Chlorine	59.0	195.00			13.0000	7.5000	293.0	767.0	
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations									
	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	LTA Proby Basis	Limiting LTA	Statistical variables for permit limit calculation AML Proby Basis	# of Samples per Month
PARAMETER	ug/L	ug/L	ug/L	ug/L	decimal	decimal	ug/L	decimal	n
Design Flow 3.0 MGD									
Chlorine	1365	1987.50	438.3	1048.3	0.60	0.99	438.3	0.95	30.00
Design Flow 6.0 MGD									
Chlorine	767	1462.50	246.3	771.4	0.60	0.99	246.3	0.95	30.00

Table F-5: Reasonable Potential to Exceed Human Health Criteria

Human Health Criteria	Ambient Concentration (Geometric Mean)	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence	Ph	Max effluent concentration measured	Coeff Variation	# of samples from which # in col. K was taken	Multiplier	Calculated 50th percentile Effluent Conc. (When n≥10).	Chronic Dilution Factor
Parameter	ug/L	ug/L	ug/L			ug/L	ug/L		Ph	ug/L	CV	n			
BIS(2-ETHYLHEXYL) PHTHALATE	0.00	5.9	0.63	NO	1	NONE	NONE	0.50	0.22	110.00	0.60	2	1.52	0.00	265.0
BIS(2-ETHYLHEXYL) PHTHALATE	0.00	5.9	0.86	NO	1	NONE	NONE	0.50	0.22	110.00	0.60	2	1.52	0.00	195.0

Table F-6: Monitoring Data Summary
Summary of ambient monitoring data from PSS010

station	date	time	depth (meters)	salinity (psu)	temperature (centigrade)	density (sigma t)	chlorophyll raw (ug/l)	dissolved oxygen (mg/l) raw	dissolved oxygen (mg/l) corrected	light transmission (%)	pH
Min					8.6	22.2	0.0	4.4	5.4	0.0	7.2
Max					12.3	23.0	1.1	7.2	7.7	84.7	7.9
average					10.3	22.8	0.4	5.8	6.5	58.0	7.6
X Percentile as shown below					11.91	22.93	1.10	7.10	7.50	82.10	7.90
X					90%	90%	90%	90%	90%	90%	90%
X Percentile as shown below					12.14						
X					95%						

Table F-7: Simple Dilution Assessment for Temperature and Fecal Coliform Ambient

Picnic Point WWTF Receiving Water Calculations

Chronic Dilution Factor	195	1
Acute Dilution Factor	59	
Facility Design Max Month Flow	6.00	mgd
	9.28	cfs

Fecal Coliform Dilution Calculation

Receiving Water Fecal Coliform	3	#/100 ml	Ambient Monitoring PSS010
Effluent Fecal Coliform - worst case	400	#/100 ml	
Downstream Fecal Coliform	5	#/100 ml	
Difference between mixed and ambient	2	#/100 ml	
Core Summer Habitat Surface Water Criteria	14	#/100 ml	Current state WAC designation

Conclusion: At design flow, discharge has small impact on receiving water fecal coliform conc.

Temperature Dilution Calculation

Receiving Water Temperature	19.20	°C	Ambient Monitoring PSS010
Effluent Temperature - worst case	19	°C	As reported in application
Downstream Temperature	19.200	°C	
Difference between mixed and ambient	0.00	°C	
Surface Water Criteria	13.0	°C	

Conclusion: At design flow, discharge has small impact on receiving temperature.

Table F-8: Assessment for Impacts to Dissolved Oxygen

Dissolved oxygen concentration following initial dilution.

References: EPA/600/6-85/002b and EPA/430/9-82-011

INPUT		Source
1. Dilution Factor at Mixing Zone Boundary:	195	MBR chronic dilution factor
2. Ambient Dissolved Oxygen Concentration (mg/L):	5.8	Min. at PSS010, 10/26/2004
3. Effluent Dissolved Oxygen Concentration (mg/L):	6.8	NPDES permit application
4. Effluent Immediate Dissolved Oxygen Demand (mg/L):	27	DMR Data max BOD 5-day
OUTPUT		
Dissolved Oxygen at Mixing Zone Boundary (mg/L):	5.67	
Decrease of 0.2 mg/L = No Measurable Change	0.13	

Table F-9: Assessment for Impacts to pH

Calculation of pH of a mixture in seawater.

Based on the CO2SYS program (Lewis and Wallace, 1998)

<http://cdiac.esd.ornl.gov/oceans/co2rprt.html>

INPUT		
1. MIXING ZONE BOUNDARY CHARACTERISTICS		
Dilution factor at mixing zone boundary	195.000	
Depth at plume trapping level (m)	2.000	not available, left as default
2. BACKGROUND RECEIVING WATER CHARACTERISTICS		
Temperature (deg C):	14.90	PSS010
pH:	8.30	PSS010
Salinity (psu):	30.70	PSS010
Total alkalinity (meq/L)	2.30	not available, left as default
3. EFFLUENT CHARACTERISTICS		
Temperature (deg C):	19.20	Permit Application
pH:	7.30	Permit Application
Salinity (psu)	0.00	
Total alkalinity (meq/L):	2.00	not available, left as default
4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>>		<div>calculate</div>
OUTPUT		
CONDITIONS AT THE MIXING ZONE BOUNDARY		
Temperature (deg C):	14.92	
Salinity (psu)	30.54	
Density (kg/m^3)	1022.56	
Alkalinity (mmol/kg-SW):	2.25	
Total Inorganic Carbon (mmol/kg-SW):	1.92	
pH at Mixing Zone Boundary:	8.30	

APPENDIX G—EPA LIST OF 126 PRIORITY POLLUTANTS

EPA List of 126 Priority Pollutants

(source: 40 CFR Part 423, titled "Appendix A to Part 403 - 126 Priority Pollutants")

Chlorinated Benzenes

Chlorobenzene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
1,2,4-trichlorobenzene
Hexachlorobenzene

Chlorinated Ethanes

Chloroethane
1,1-dichloroethane
1,2-dichloroethane
1,1,2-trichloroethane
1,1,1-trichloroethane
1,1,2,2-tetrachloroethane
Hexachloroethane

Chlorinated Phenols

2-chlorophenol
2,4-dichlorophenol
2,4,6-trichlorophenol
Parametachlorocresol (4-chloro-3-methyl phenol)

Other Chlorinated Organics

Chloroform (trichloromethane)
Carbon tetrachloride (tetrachloromethane)
Bis(2-chloroethoxy)methane
Bis(2-chloroethyl)ether
2-chloroethyl vinyl ether (mixed)
2-chloronaphthalene
3,3'-dichlorobenzidine
1,1-dichloroethylene
1,2-trans-dichloroethylene
1,2-dichloropropane
1,2-dichloropropylene (1,3-dichloropropene)
Tetrachloroethylene
Trichloroethylene
Vinyl chloride (chloroethylene)
Hexachlorobutadiene
Hexachlorocyclopentadiene

Haloethers

4-chlorophenyl phenyl ether
2-bromophenyl phenyl ether
Bis(2-chloroisopropyl)

Halomethanes

Methylene chloride (dichloromethane)
Methyl chloride (chloromethane)
Methyl bromide (bromomethane)
Bromoform (tribromomethane)
Dichlorobromomethane
Chlorodibromomethane

Nitroamines

N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine

Phenols (other than chlorinated)

2-nitrophenol
4-nitrophenol
2,4-dinitrophenol
4,6-dinitro-o-cresol (4,6-dinitro-2-methylphenol)
Pentachlorophenol
Phenol
2,4-dimethylphenol
1, 2-diphenyl hydrazine (azobenzene)
Total Phenolic Compounds

Phthalate Esters

Bis(2-ethylhexyl)phthalate
Butyl benzyl phthalate
Di-n-butyl phthalate
Di-n-octyl phthalate
Diethyl phthalate
Dimethyl phthalate

Polynuclear Aromatic Hydrocarbons (PAHs)

Acenaphthene
1,2-benzanthracene (benzo(a)anthracene)
Benzo(a)pyrene (3,4-benzo-pyrene)
3,4-benzofluoranthene (benzo(b)fluoranthene)
11,12-benzofluoranthene (benzo(k)fluoranthene)
Chrysene
Acenaphthylene
Anthracene
1,12-benzoperylene (benzo(ghi)perylene)
Fluorene
Fluoranthene
Phenanthrene
1,2,5,6-dibenzanthracene
(dibenzo(a,h)anthracene)
Indeno (1,2,3-cd) pyrene (2,3-o-phenylene pyrene)
Pyrene

Pesticides and Metabolites

Aldrin
Dieldrin
Chlordane (technical mixture and metabolites)
Alpha-endosulfan
Beta-endosulfan
Endosulfan sulfate
Endrin
Endrin aldehyde
Heptachlor
Heptachlor epoxide (BHChexachlorocyclohexane)
Alpha-BHC
Beta-BHC
Gamma-BHC (Lindane)
Delta-BHC
Toxaphene

DDT and Metabolites

4,4-DDT
4,4-DDE (p,p-DDX)
4,4-DDD (p,p-DDE)

Polychlorinated Biphenyls (PCBs)

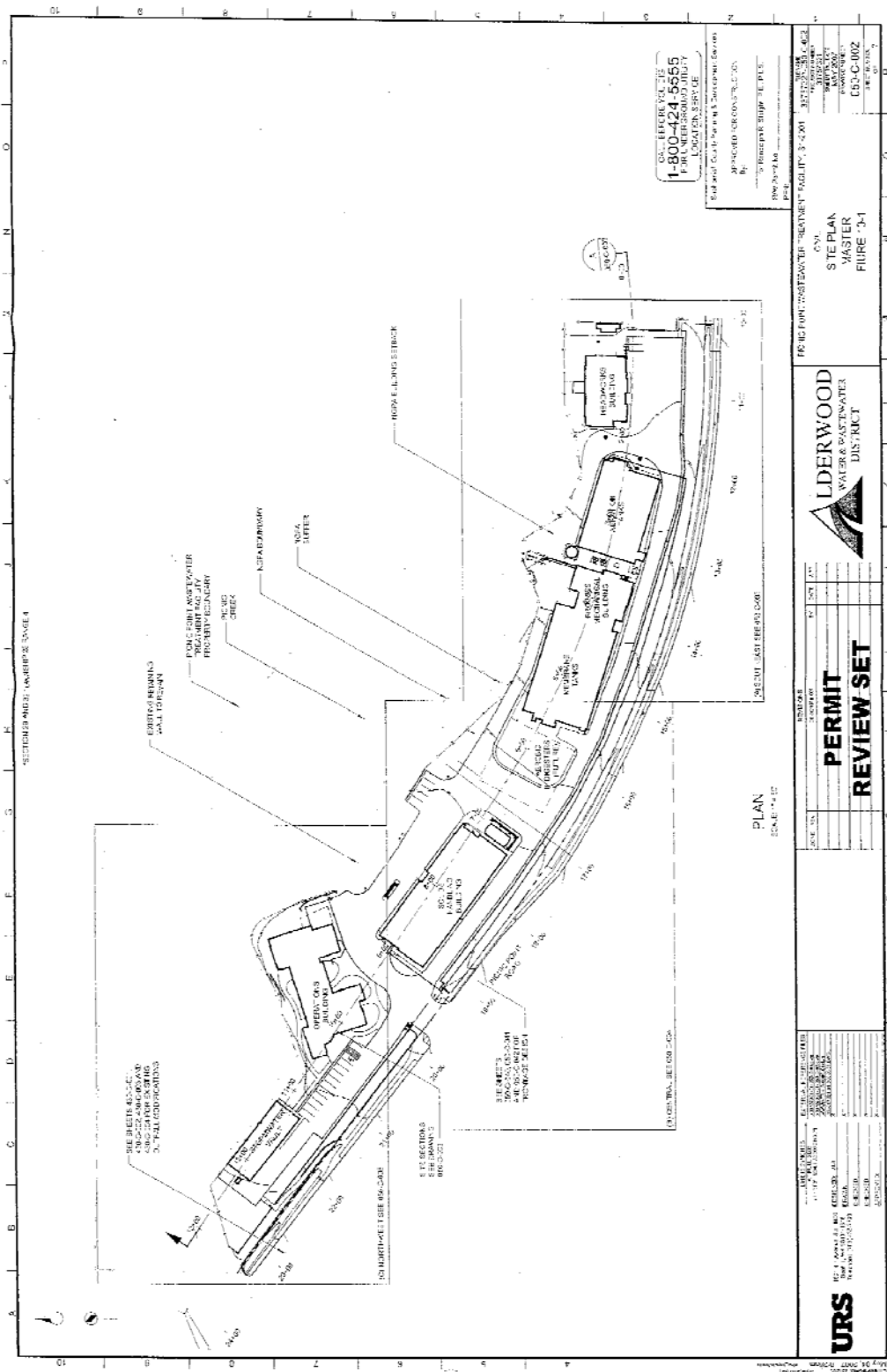
PCB-1242 (Aroclor 1242)
PCB-1254 (Aroclor 1254)
PCB-1221 (Aroclor 1221)
PCB-1232 (Aroclor 1232)
PCB-1248 (Aroclor 1248)
PCB-1260 (Aroclor 1260)
PCB-1016 (Aroclor 1016)

Other Organics

Acrolein
Acrylonitrile
Benzene
Benzidine
2,4-dinitrotolulene
2,6-dinitrotolulene
Ethylbenzene
Isophrone
Naphthalene
Nitrobenzene
Tolulene

Inorganics

Antimony
Arsenic
Beryllium
Cadmium
Chromium, total
Copper
Cyanide, total
Cyanide, weak acid dissociable
Lead
Mercury
Nickel
Selenium
Silver
Thallium
Zinc



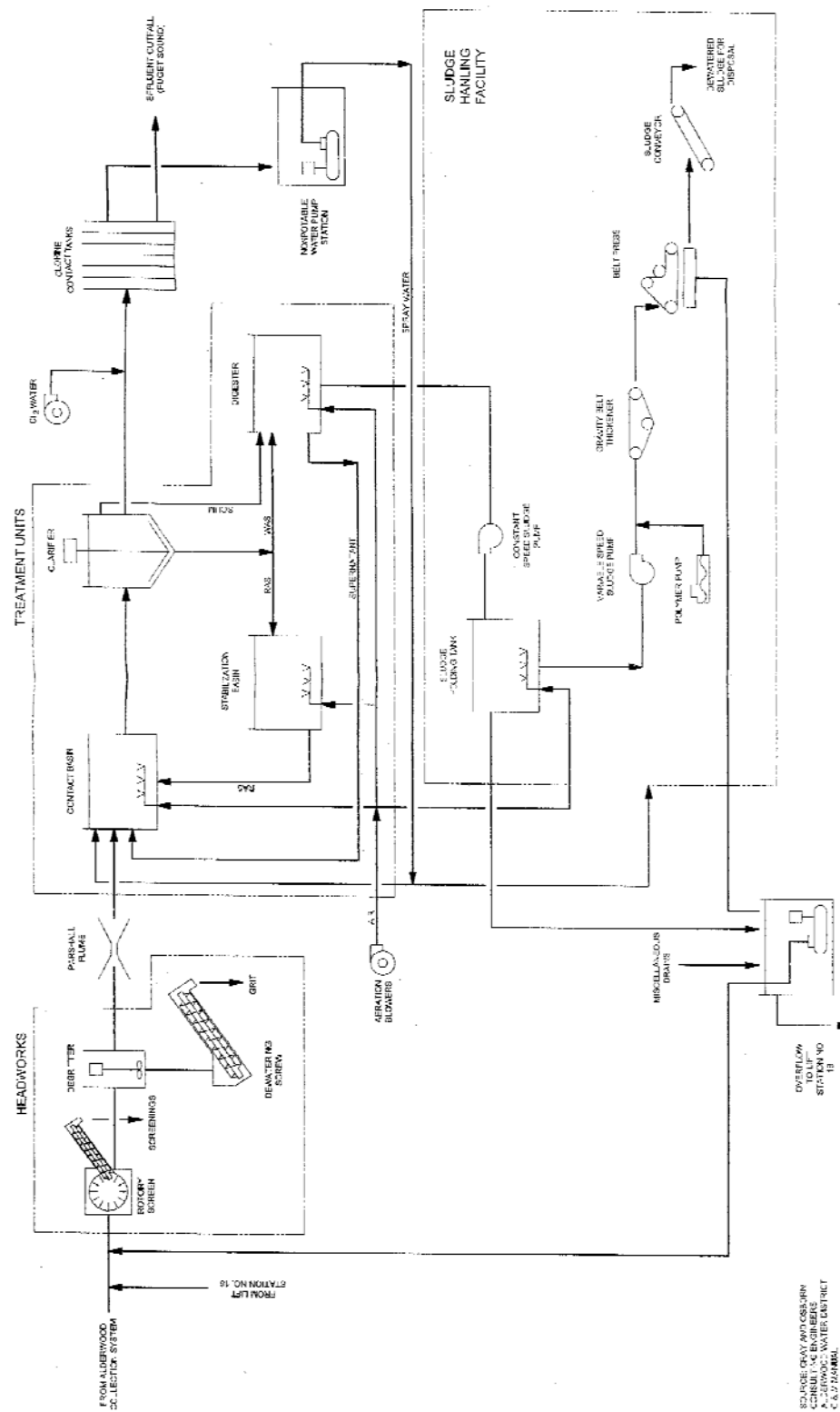


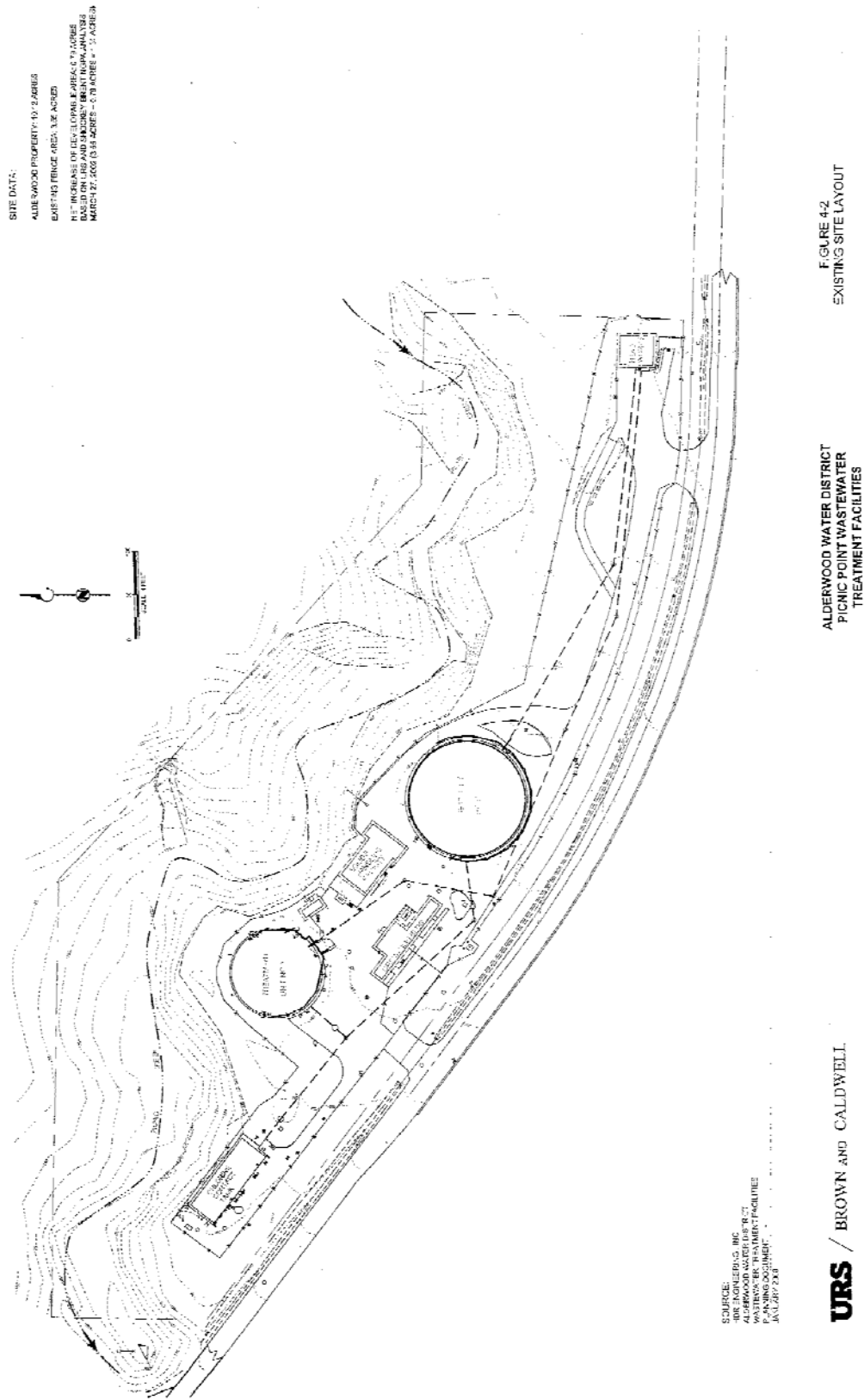
FIGURE 4-3
OVERALL PROCESS FLOW SCHEMATIC

**ALDERWOOD WATER DISTRICT
PICNIC POINT WASTEWATER
TREATMENT FACILITIES**

URS / BROWN AND CALDWELL

SOURCE: GRAY AND OSBORN
CONSULTING ENGINEERS
A. JERWOOD WATER DISTRICT
C & P MANUAL
JUNE 1933

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DOI: 10.1002/jms.1000



APPENDIX I—RESPONSE TO COMMENTS

No comments were received by Ecology on the draft.